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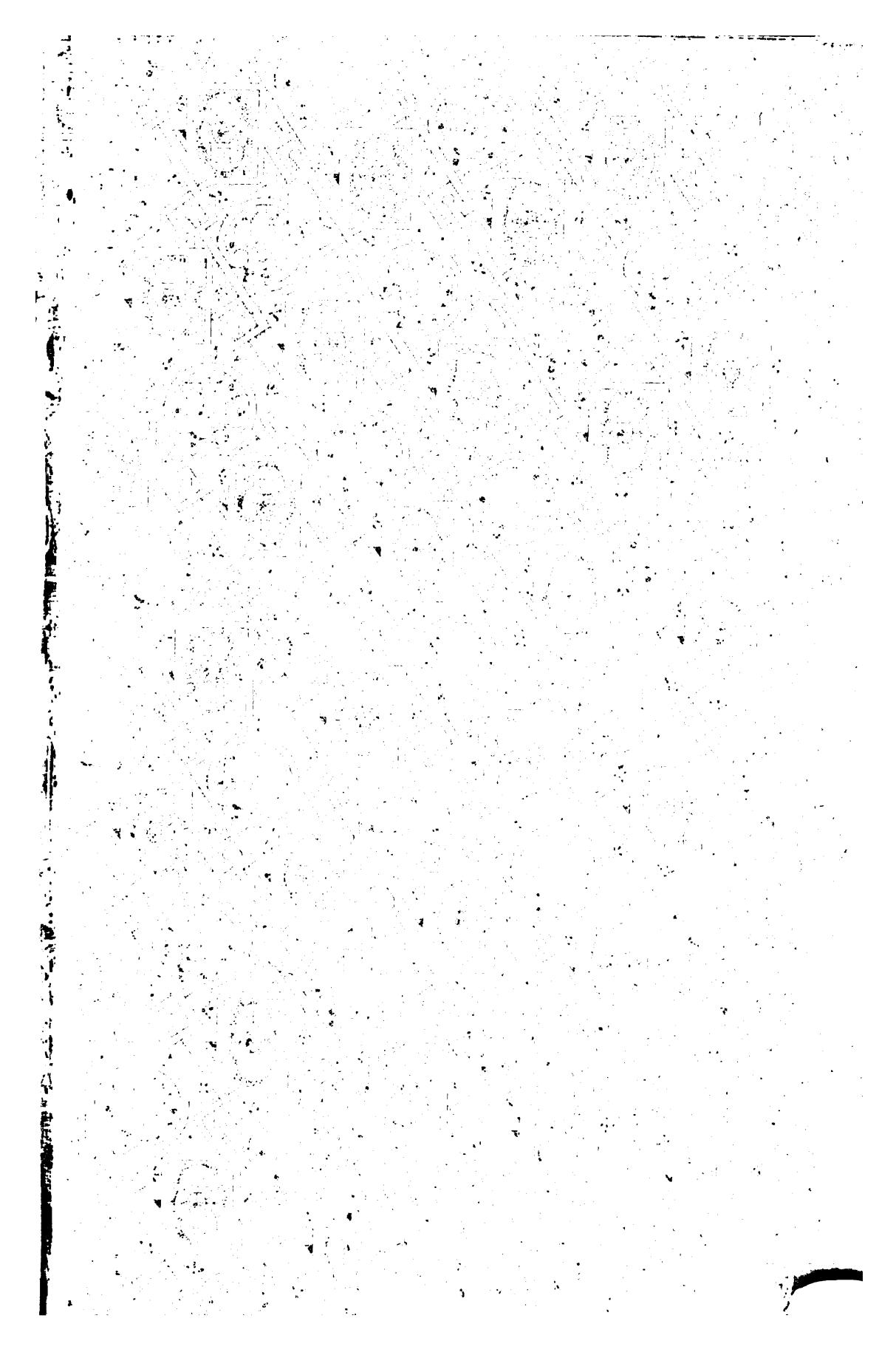
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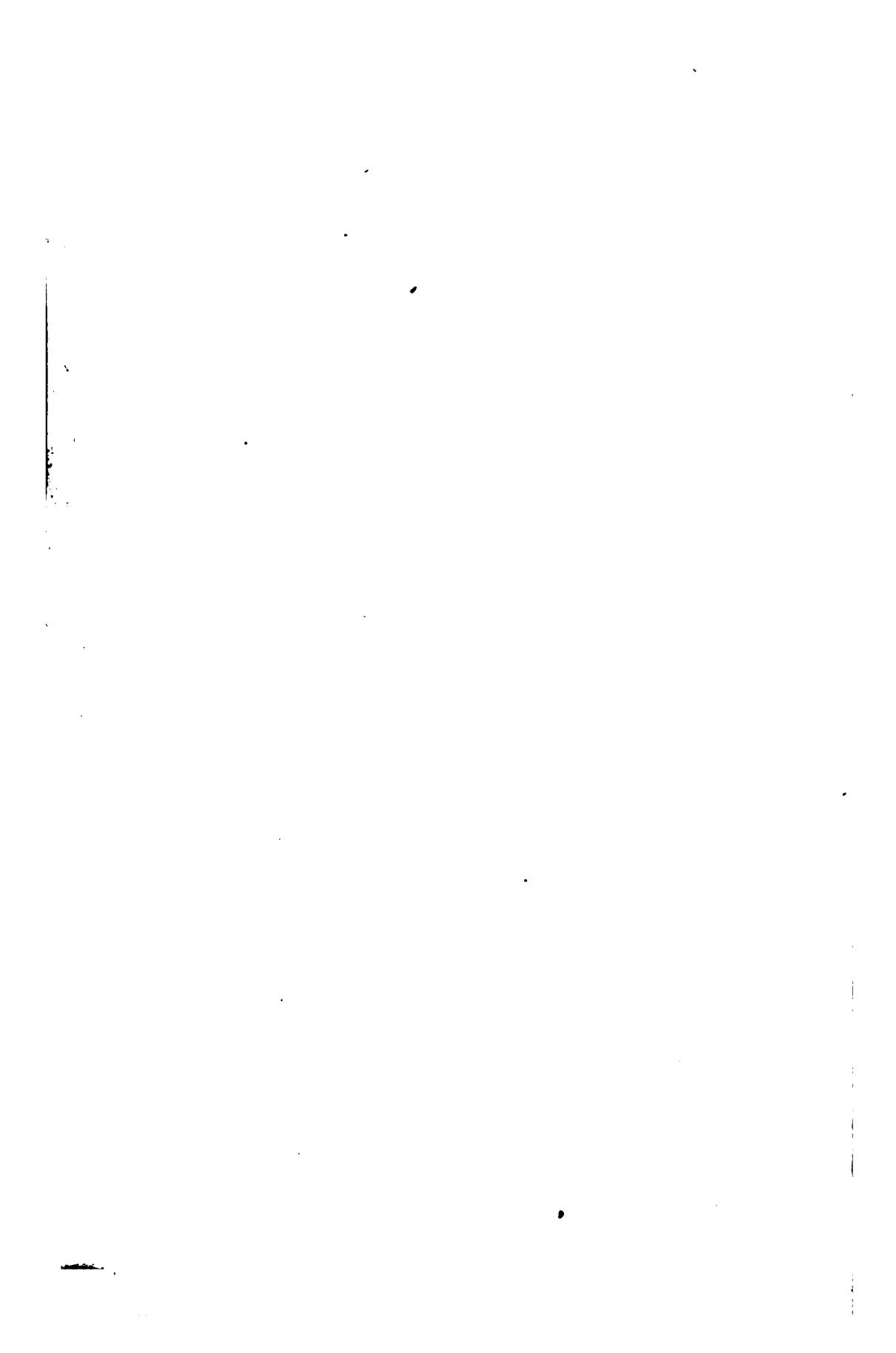
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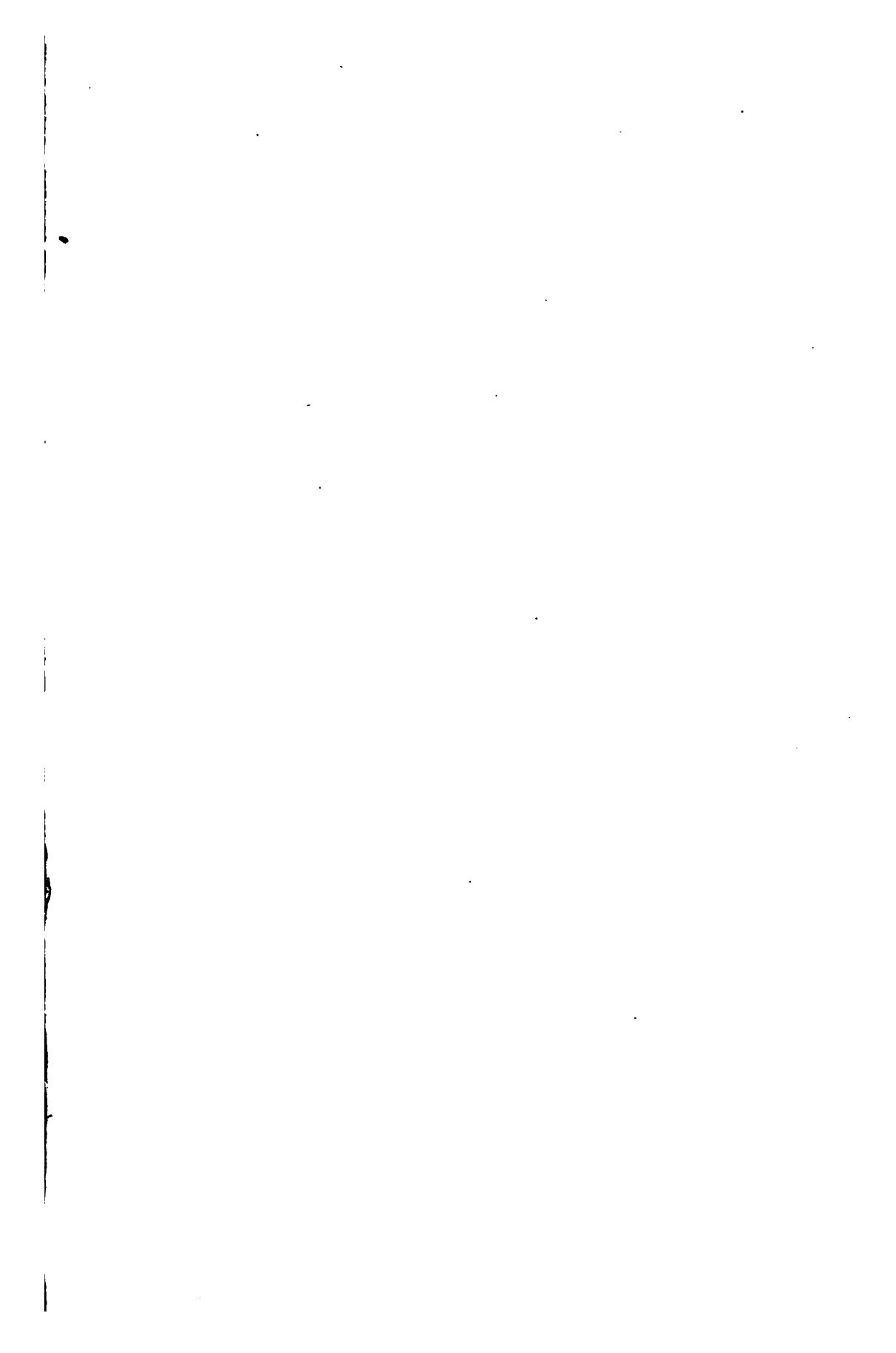
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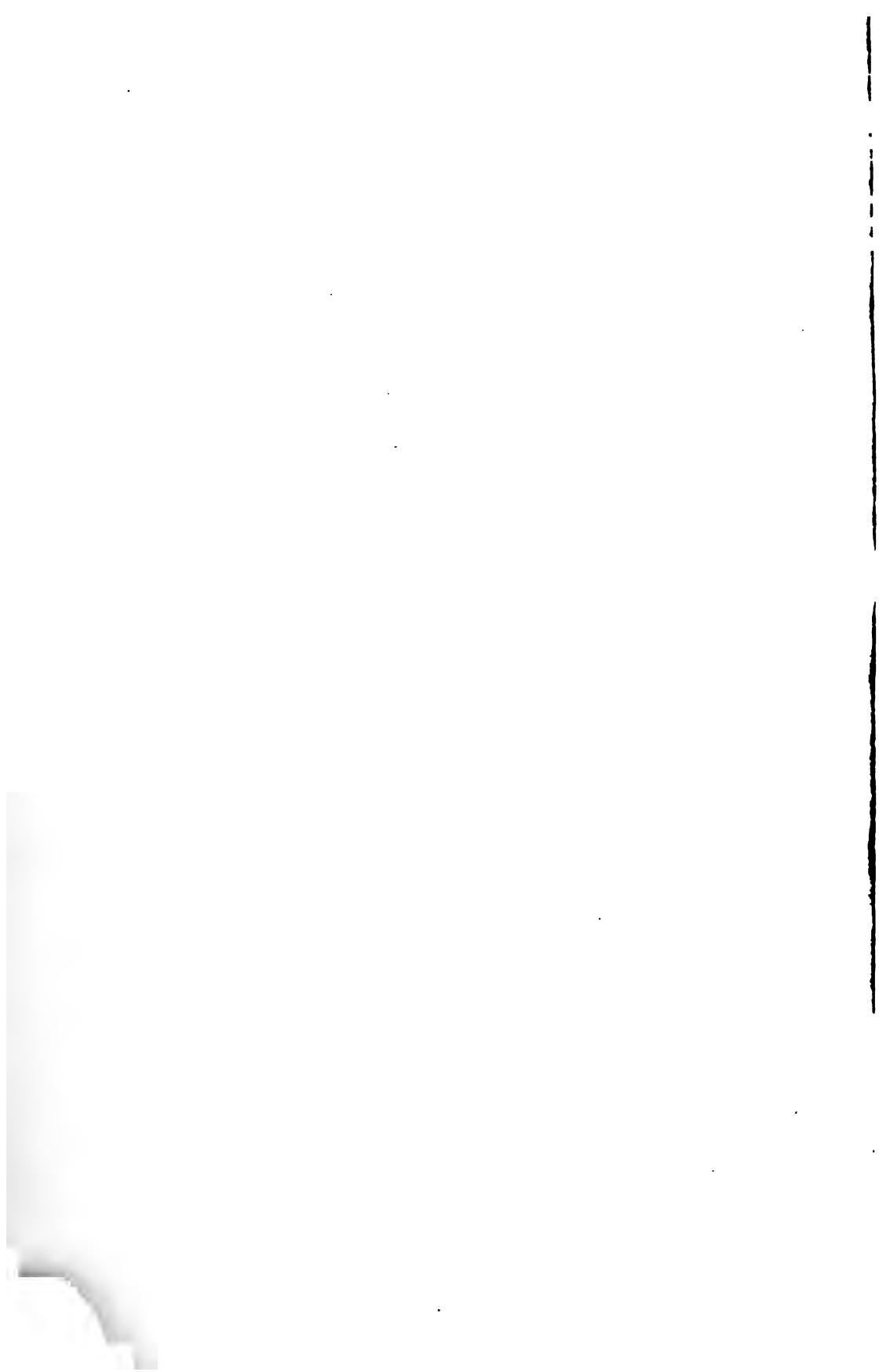


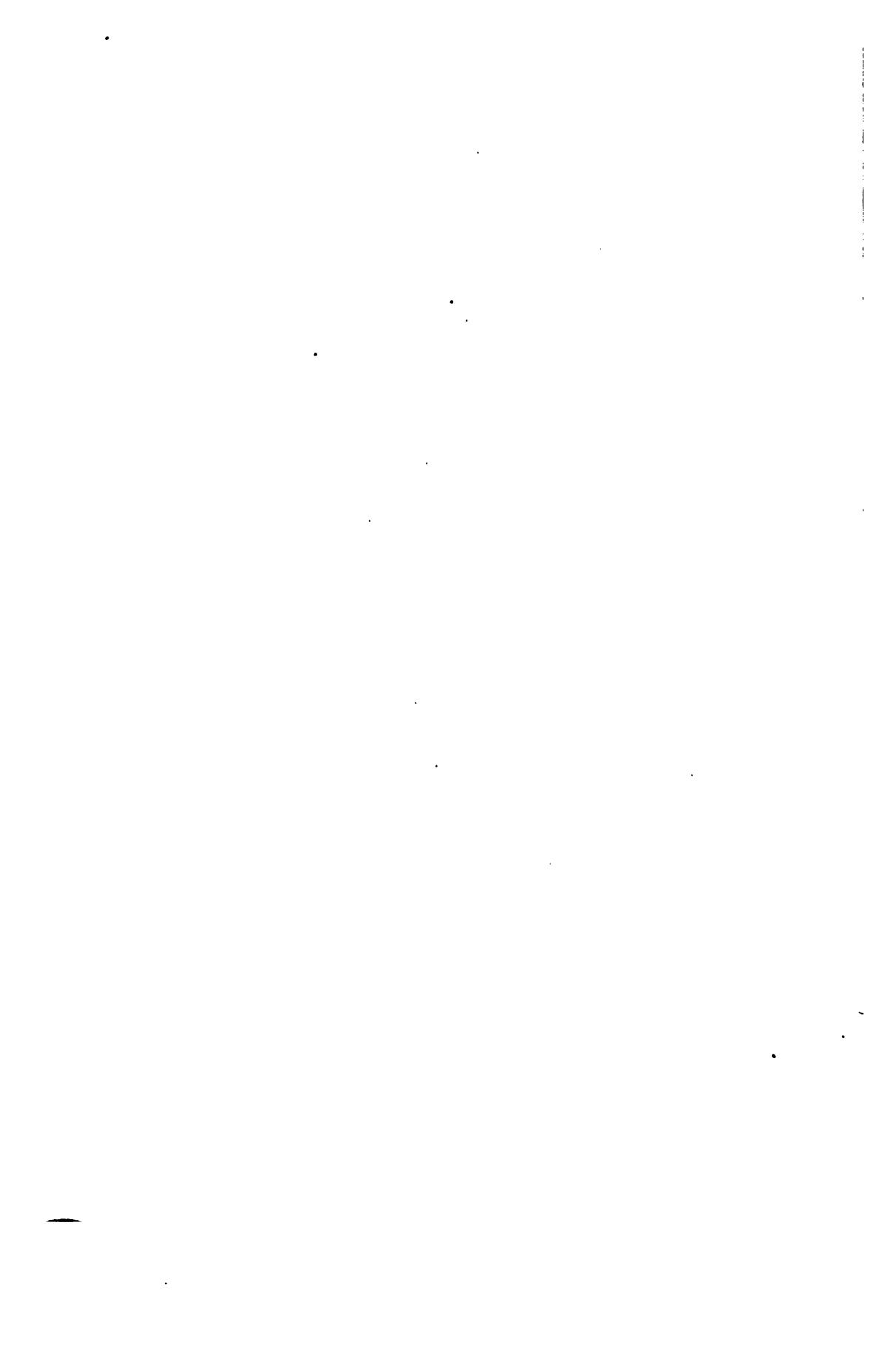
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ANNUAL
OF THE
UNIVERSAL MEDICAL SCIENCES

A YEARLY REPORT OF THE PROGRESS OF THE GENERAL
SANITARY SCIENCES THROUGHOUT THE WORLD.

EDITED BY

CHARLES E. SAJOUS, M.D.,

AND

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ASSISTED BY

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DISEASES OF THE SKIN.

BY ARTHUR VAN HARLINGEN, M.D.,
PHILADELPHIA.

ACNE.

Acne Necrotica.—Dubois-Havenith²⁷⁶ says that the elementary lesion of this disease consists in a slightly elevated, pea-sized papule, which, developing in the hair-follicle, soon becomes covered with a yellowish, very adherent crust. The latter enlarges little by little, and finally falls off, leaving a cicatrix. The elementary lesion is a necrobiotic pilo-sebaceous peri-folliculitis. The usual seat of the disease is the scalp, beard, and nose, but it is occasionally encountered on the trunk. Bök, of Christiania, has described a large staphylococcus and a small streptococcus in this form of acne, but cannot affirm that these cause the lesion. This form of acne may be mistaken for ordinary acne, but is more liable to be confounded with the papulo-ulcerative syphiloderm. The treatment employed by Dubois-Havenith consists of lotions of a 1-to-1000 sub-limate solution, and the application of emplastrum de Vigo at night. However, these often fail, and the curette, the electric needle, or a caustic like chloride of zinc must be employed.

Hartzel,¹¹² in a case of acne of extreme severity, with numerous abscesses covering the face, chest, and back, used the following :—

R. Sulphuris præcip.,

Saponis viridis, 3ij (7.78 grammes).

Petrolat., 3ss (15.00 grammes).

M. Sig.: Apply with friction at night, and wash off in the morning.

ACTINOMYCOSIS.

Actinomycosis of the Face.—Darier and Gautier⁸ presented a case of this affection before the French Dermatological Society some time ago. The affection began in the form of a small sub-cutaneous tumor over the right jaw, which grew rapidly within a

few weeks, invaded the skin, and opened like an abscess. Meantime, other nodules had developed in the neighborhood surrounding the original lesion and following the same development. When first carefully examined, two months later, the patient, a German woman 25 years of age, presented a diffuse patch of dusky, violaceous, infiltrated skin covering the whole cheek, and resembling a lupus-patch, with here and there hemispherical fluctuating nodules rising above the surface, some of which were ulcerated. Palpation showed the tissues of a wooden hardness beyond the visible border of the patch and strongly adherent to the underlying parts. There was little pain, though the patch was tender upon pressure. Microscopic examination of the pus showed a large number of minute, opaque, white grains, showing, on observation, the characteristic structure of actinomyces. The treatment, which was successful, was electro-chemical,—the injection of iodide of potassium, decomposed by the electric current. No details are given.

ADENOMA SEBACEUM.

Adenoma Sebaceum.—Caspary⁴⁵ had as a patient a girl of 19, the subject of hundreds of small, pin-head to lentil-sized, yellowish or reddish-yellow tumors of the nose, cheeks, and forehead, some rounded, others flat, not confluent. They were firm and elastic, and showed blood only when pricked. They had developed after small-pox. Histological examination showed the tumors to consist of a great number of sebaceous glands, closely packed in the deeper parts of the corium, the other structures of the skin being healthy. Balzer, in 1885, and Pringle, in 1890, described similar cases.

ALOPECIA.

Classification of Alopecias.—Fournier³¹ divides alopecias into two groups: (1) alopecia with visible lesions of the scalp; (2) alopecia without apparent lesions of the scalp. The first group may be subdivided into four classes, according to the character of the lesions, and are tabulated as follows:—

1. Ulcerations: (a) Traumatic (wounds, burns); (b) Diathetic (scrofula, syphilis, leprosy).
2. Dermatoses: Erysipelas, sun-stroke, eczema, impetigo, psoriasis, pityriasis, etc.
3. Parasitic affections: Trichophyton, favus.

4. Lesions acting by distension : Tumors.

In this group the diagnosis is easy. A patient complains of falling of the hair. On examination, a fine, scaly condition of the scalp is found. Here pityriasis is the cause of the alopecia, etc.

The second group includes five distinct classes of alopecia.

1. Senile and premature alopecia.
2. Alopecia accompanying convalescence from severe disease.
3. Cachectic alopecia.
4. Syphilitic alopecia (without lesions of the scalp.)
5. Alopecia areata.

Senile alopecia is a physiological condition determined by the deterioration of advancing years. It begins, on the average, between the ages of 35 and 40, but there are many exceptions in both directions. Ricord, Fournier's great master, at 90 retained his abundant chestnut hair, hardly tinged with gray. In other cases the hair whitens, but persists. Chevreul, the chemist, who died a few years ago, over a century old, had an abundant mass of white hair to the last.

Fournier considers gout and the gouty or an arthritic diathesis as a cause of premature alopecia in the patients and even their progeny. I can hardly assent to this assertion, which seems too sweeping; a moment's thought brings to mind numerous exceptions in my own experience. All prolonged debilitating influences may give rise to alopecia, Fournier says,—excessive work, especially intellectual; genital excesses, and overindulgence at the table, or watching and late hours. Excessive intellectual work, however, Fournier says, is less likely to produce alopecia than the other forms of excess. In this I readily agree with him, and, while I think his admirable classification of alopecias must be of use to the student, yet it seems he lets his system run away with him a little at times. Some aspects of the question of baldness seem to escape us, as, why women are so much less liable to alopecia than men; why it seems to run in families, etc. A curious fact (not, however, without many exceptions) is, that the bald suffer from hot heads, and are often seen walking in the open air, hat in hand.

The peculiarities of senile and precocious alopecia are:—

1. It is severe and progressive.
2. It is systematic, and confined to the antero-superior portion

of the scalp. It begins on the top of the cranium and moves forward, leaving a little tuft of hair above the forehead. Sometimes it only amounts to a greater or less thinning of the hair; at other times it denudes the scalp completely. The posterior and lateral portions of the scalp, it is to be remarked, however, preserve their hair almost or quite intact.

3. This form of alopecia is perfectly symmetrical, and has nothing ridiculous about it like alopecia areata.

The alopecia of convalescence occurs, as its name implies, after the course of a disease. Typhoid fever; the eruptive fevers, especially scarlatina and, less frequently, erysipelas; the severer phlegmonous diseases, and typhus are followed by alopecia, as also occasionally severe accidents, haemorrhages, and—a physiological cause in women—pregnancy. Many women lose their hair after a perfectly normal labor. Fournier says nothing of the influence of nursing, but I am inclined to think this should be considered. It would be interesting to note if alopecia takes place when the woman does not nurse her infant, even when retaining perfect health.

The alopecia of convalescence is very rapid in its course, being produced in the course of a few weeks. It is general, affecting all parts of the scalp equally; it is moderate, rarely resulting in complete baldness. This form of alopecia, Fournier says, is temporary and reparable, unlike senile and premature alopecia. He asserts that if the alopecia of convalescence occurs during youth entire reparation of the loss occurs, but this is not by any means always the case in my experience. We frequently find young women with fine suits of hair who lose this largely after severe illness, never to be entirely replaced. After the age of 40, Fournier admits that the hair is rarely reproduced in its integrity. The cause of this form of alopecia lies in disturbance of nutrition of the tissues. The nails also show this in the furrow marked across them after severe illness.

Cachectic alopecia is met with in the course of pulmonary phthisis, cancer, cirrhosis, malaria, scorbutus, diabetes, etc. This form of alopecia, like the preceding, affects the entire scalp impartially. The influence of the cachexia is shown, at the same time, on the hairs which remain. These are dry, lustreless, and brittle; they often break off before falling out. Fournier then goes on to

give an account of syphilitic alopecia, to which, on account of its diagnostic importance, we give a special place.

Syphilitic Alopecia.—Fournier^{17, 18} says that syphilitic alopecia is not irremediable. It is a frequent symptom. In 60 cases of non-treated syphilis, Diday observed it in 53. But syphilis never causes permanent and complete baldness. Properly treated, the disease, in Fournier's private practice, is only accompanied by extensive alopecia in 1 case out of 20. Some varieties of syphilis are more apt to be accompanied by alopecia than others. They include those cases which affect the general nutrition severely; but occasionally mild cases are accompanied by severe alopecia. We do not know at all why one patient should lose little or no hair and another become bald. The alopecia of syphilis occurs in the third to the sixth month of the disease, or rarely, in poorly treated cases, at the end of one or even two years. In France, it appears that men of the world who become bald between 40 and 50 are supposed to be displaying the results of the wild oats of their youth. Nothing is more false. If alopecia comes as a result of syphilis, it comes early in the disease or not at all. Fournier says there are two forms of syphilitic alopecia: symptomatic, accompanied by visible lesions, or idiopathic, unaccompanied by perceptible lesions of the scalp. The symptomatic variety is accompanied either by pustulo-crustaceous, "acneform" lesions, forming the little brownish or blackish crusts so common in the scalp of syphilitic patients from the third to the sixth month, or, more rarely, by a very slight pityriasis-like eruption, sometimes only to be distinguished by the aid of a lens.

The idiopathic form of syphilitic alopecia is the most common. Giovaninni and Darier have shown that there are really lesions in this affection. It appears that there is a proliferation in the hair-bulb, and that the fallen hair is often found to be atrophied at its root. There is no itching, redness, nor other symptom occurring in connection with syphilitic alopecia, other than the mere falling of the hair. It is asymmetric, affecting any locality by chance. Sometimes the fall of hair is diffused, resulting in a general thinning; at other times it occurs in patches; occasionally both forms occur together. The alopecia in patches resembles, in a certain way, alopecia areata, but it has certain characters which are perfectly pathognomonic. Alopecia areata makes a clean sweep, all

the hairs on the patch falling out. In syphilis, however, some hairs always remain on the affected patches, which also are never so regular, rounded, or extensive as those of alopecia areata. Another diagnostic point is that the area-like alopecia of syphilis is always accompanied by the disseminate form; whereas, in alopecia areata the hair is usually normal up to the very edge of the bald spot. Finally, alopecia areata decolorizes the skin, which becomes dead-white, while the bald areas of syphilis retain their natural color.

Syphilitic alopecia of all grades may occur. Fournier has even seen a single case in which complete alopecia occurred; only seventeen hairs could be counted upon the whole scalp. In the severer forms of syphilitic alopecia the entire scalp suffers in its vitality. The hairs which remain become dry and lustreless like dead hairs. Syphilitic alopecia is temporary. At the end of four to six months the hair is reproduced, even when the patient has not received treatment. The first hair reproduced is fine and downy, but afterward it becomes of normal strength. Other parts of the surface besides the scalp may be affected. The moustache and beard are frequently thinned,—sometimes diffusely, sometimes in small, alopecia-areata-like patches. I am sorry that Fournier has not pointed out how these patches can be distinguished from those of alopecia areata of the beard. My impression is, that the patches are entirely denuded in both cases, and without corroborative symptoms I should be puzzled to designate the character of a given case.

As regards syphilitic alopecia of the eyebrow, this is an interesting and highly characteristic lesion. It is diffuse and in areas like that of the scalp. Curiously, also, the hairs which remain, instead of being all pointed in the same direction, as in the normal condition, are pointed all sorts of ways, giving a brush-like appearance to the eyebrow. Congenital keratosis pilaris may be mistaken for this form of syphilitic alopecia, as also may alopecia areata. The former, however, shows a reddened, rough, nutmeg-grater surface. Fournier does not tell us how to distinguish the latter. The mons veneris is apt to be affected in syphilitic alopecia, also the axillæ. Fournier says that syphilitic alopecia is easily curable by the internal use of mercury. He thinks local applications useless; but here I must differ from him, thinking them valuable adjutants.

Alopecia Areata.—Radcliffe Crocker, ^{Feb. 25, 1887.} in an interesting article on this subject, read before the British Medical Association, gives the results of his experience in 257 cases of alopecia areata. He thinks four classes of cases are included under the generic name alopecia areata.

Class 1. Universal alopecia: when there is a general falling off, often very rapid, and accompanied, in some cases, by changes in, or even falling off of, some or all of the nails. Sometimes this occurs in persons of fair health without obvious reason, but in other cases it is reported as the result of fright, worry, or injuries. In a large proportion of these cases the loss of hair is permanent, and the course, for the most part, rapid. These cases are very rare; though, as they are apt to be reported, they seem more numerous, comparatively, than they are in reality.

Class 2. Baldness occurring in one or more patches at the site of an injury or in the course of a recognizable nerve. These are a very few in number, comparatively, but there are many on record. In a case seen by Crocker, a melancholic woman, there were white patches of hair in the course of the left supra-orbital and a bald patch of two to three inches in diameter. Pontoppidan tells of the case of a girl of 10, who had some glands removed in the left carotid region, which operation was followed by ocular paralysis, indicating injury to the sympathetic nerve, while loss of hair in areas on the back of the head took place, and six weeks later the whole back of the head became denuded in the region corresponding to the domain of the major and minor occipital nerves and the posterior branch of the auricularis magnus. Within three months the hair began to grow again. Joseph excised the second cervical ganglion in the cat and rabbit, and this operation was followed by alopecic patches in the territory of the second cervical, the occipital, and the great auricular nerves, but some uncertainty has been cast upon his results. Two instances of local baldness on the site of a blow are related by J. Collier. ^{June 11, 1887.}

Class 3 is the form originally described by Neumann as "alopecia circumscripta seu orbicularis." In this the patches are small, from lentil- to pea- size, much depressed below the surface, with often a marked decrease of the sensibility. Crocker thinks this a very rare form, and says that the prognosis is unfavorable. The nails of the fingers and toes may also be involved in this

variety of alopecia. Crocker gives notes of a case of his own of this variety and alludes to Sangster's.^{607, 50} These cases are distinguished by the very marked depression of the bald area below the surrounding skin, and must not be confused with the pea-sized, bald, smooth, white spots on which the area is not depressed, and which are to be referred to the fourth class. Few, says Crocker, would dispute that all three of these classes are essentially of a tropho-neurotic nature. The prognosis of the first and third class is, for the most part, unfavorable. Taken collectively, they form a very small proportion of cases classed as alopecia areata,—certainly not 10 and perhaps not 5 per cent. It might be convenient to place them under the head of "alopecia neurotica," with varieties, —universalis, localis, and circumscripita.

Class 4. This is not only numerically the largest by far, but the one most open to discussion as to the origin of the affection. Crocker thinks it is due to a vegetable parasite, and that we should go back to the term "tinea decalvans." One variety of this class is where the patches are of one-half to two inches in diameter, roundish at first, but later larger and irregular,—from coalescence. They commence more frequently at the back of the head than elsewhere, but may come on any part of the scalp. Another, and less frequent form, is a broad band of baldness, which may go all around the head. This variety progresses more rapidly than the first and its prognosis is less favorable. It is the "ophiasis" of Celsus. The bare areas are smoother and whiter, and the tissue is lax and thinner than normal skin. In all recent and active cases there are short hairs, about one-eighth of an inch long, thicker at the free end than at the tapering point of insertion, so that these stumps look like an exclamation-point (!). They pull out almost with a touch, and very soon fall out spontaneously, so that their presence betokens recent extension. Crocker believes them to be characteristic of this form of the disease and to be absent in the other forms. They are seldom present in great numbers, but Crocker has once seen them covering the whole of a new patch. As the disease ceases to extend, these short hairs disappear entirely.

In a large number of cases, the origin of alopecia areata cannot be traced. The disease occurs chiefly in the prime of life. No less than 188 cases out of 207 were under 40 years of age, and, in private practice, 35 out of 50. Exceptionally only is there

any departure from health. In only 1 of Crocker's 50 private cases was there a history of syphilis some years before, but without recurrent symptoms. Ten cases had noted some departure from health; 3 were subject to headache; 1 had suffered in a railway accident, which had left him nervous; 2 were notably neurotic women; and 1 had sciatica. The remaining 31 were quite healthy. A curious point was that, of Crocker's 50 private cases, not less than 11 had had previous attacks. Of 200 hospital cases, 22 had had previous attacks. Crocker thinks that, although a certain number of cases of alopecia areata may have a neurotic origin, this theory is inapplicable to nine-tenths of all cases met with. The theory of a parasitic origin of most cases has been strongly contested, but has a certain number of facts in its favor, and has certainly gained almost complete credence in France, where alopecia areata is more frequent, proportionately, than in other countries.

Some cases given by Crocker illustrate the view of contagion: A man of 27 stated that it came on eight days after wearing a theatrical wig; a lady ascribed it to a servant using her brushes; a man aged 55 stated that it came on soon after having his hair cut by a country barber; a man aged 23 worked alongside of a man who also had it; a lady aged 50 stated that hers began soon after sleeping, for three weeks, with a married daughter who was suffering from it, who ascribed it to sleeping with a lady who had been quite bald from childhood, etc. These are specimens of the cases adduced by Crocker, but this seems to me the weakest part of his paper. Patients will give such histories for any disease they have which they fancy contagious.

Crocker believes there is a close relationship between tinea tonsurans and alopecia areata. His cases illustrative of this are most convincing. A medical man, who had been treating cases of ringworm, observed bald patches in his beard, at a point where he was accustomed to rubbing his chin with his hand. On microscopic examination, fungous elements, like those of tinea tonsurans, were found in the hairs around the patch. Crocker mentions a number of similar cases, and meets the objection that we have here to deal with the bald form of tinea tonsurans by stating that the short hairs, as in alopecia areata, are club-shaped, whereas, in tinea tonsurans, they are bent and twisted.

Crocker concludes that his fourth class of alopecia is, to a limited extent, contagious under favorable circumstances, though far less so, of course, than tinea tonsurans. Cases with all the signs of alopecia areata may arise—not in children only, but in adults—from contact with ordinary tinea tonsurans. Not only may tinea tonsurans begin in a bald form, but cases which have begun in the ordinary way may be converted into alopecia areata in children. Crocker says that the fungus may be found in alopecia areata by extracting the loose hairs around the border of the patches and examining their root-sheaths. It is useless to examine the club-shaped short hairs, and the fungus will only be found in the root-sheaths of the loose hairs and not in the shaft. A good many of the loose hairs around the border of the patches are to be pulled out and examined with a lens. Those having root-sheaths attached are selected, and the root-ends cut off and treated with liquor potassæ, or saturated solution of caustic potash in glycerin. The portions of epidermis attached to the shaft are examined with a proper power, without much manipulation, lest the epidermis be detached and lost. The fungus is always in small foci, and, perhaps, only in one of several selected hairs; sometimes it may be seen at the very extremity of the root, as if it had worked around and separated the hair from its papilla. Crocker thinks that in most recent cases the fungus can be shown with a sufficiently careful search; but he has found it more easily in hairs from the beard than in those from the scalp.

Crocker says that the percentage of alopecia areata in different countries is, approximately, as follows: France, 3 per cent.; England, 2; Scotland, 1.5; Vienna, 0.75; North Germany, 0.75 to 1; America, 0.5. It is worthy of notice, he says, also, that alopecia areata is most common where tinea tonsurans is most common, and that the neurotic theory is most strongly held in those countries—as Germany and America—in which both ring-worm and alopecia areata are comparatively rare.

With regard to the treatment of alopecia areata, Crocker blisters recent patches, while, at a later stage, those parasiticides which are also powerful stimulants, give the best results in his hands. The loose hair around the patches should first be pulled out, and, when practicable, from $\frac{1}{2}$ drachm (1.97 grammes) to 1 drachm (3.89 grammes) of chrysarobin to 1 ounce (31

grammes) of lanolin and oil is one of the best applications. A cleaner and a more universally applicable remedy, even for the face, is 2 to 5 grains (0.13 to 0.32 gramme) of perchloride of mercury, 1 drachm (3.37 grammes) of rectified spirit of wine, to 7 drachms (23.63 grammes) oil of turpentine. The smaller proportion should first be used, and the strength increased as the patient can bear it. It should be rubbed in with the finger, not only on but around the patch, night and morning. Internal medication Crocker thinks of no use, except in the late stage, when the disease is not spreading, but only the dormant vitality of the hair-follicles requires awakening. Then Crocker thinks pilocarpine may be given with advantage, internally, in the dose of $\frac{1}{8}$ to $\frac{1}{4}$ of a grain (0.011 to 0.016 gramme) at bed-time. He also gives this drug hypodermatically, in the dose of $\frac{1}{10}$ to $\frac{1}{8}$ of a grain (0.0065 to 0.011 gramme), but at the patient's house, for fear of nausea and faintness.

As confirmatory of Crocker's views, we may mention an article by Hutchinson.⁸⁰⁶ A lady applied to Hutchinson with large patches of alopecia. Four years previously several of her children had suffered with ringworm, and she had attended to their heads. Three years later the first bald patches showed themselves. This is not very convincing, but Hutchinson says it is one of many similar cases which have come under his notice. Another case given is that of a young singer who suffered from ringworm of the beard, cured by epilation, etc. Three years later alopecia appeared, limited to the beard.

Treatment.—Wermann¹²³ _{Aug. 1} thinks that there is a parasitic and a nervous form of alopecia areata. He treats the parasitic form by careful antiparasitic applications, and in the nervous variety employs faradization. Morrow²⁴⁵ _{Oct.} employs all constitutional means of improving the general nutrition—iron, quinine, codliver-oil, phosphorus, and strychnia. Locally, he clips the hair around the affected patches, epilates loose hairs, and applies chrysarobin, 20 to 40 grains (1.30 to 2.59 grammes), with or without salicylic acid, 10 to 15 grains (0.65 to 0.97 gramme) to the ounce (31 grammes), either suspended in liquid gutta-percha or in the form of ointment. He endeavors to excite and keep up a moderate dermatitis. When the alopecia is severe and extensive, he shaves the scalp and applies acetic acid, in greater or less proportion, mixed with equal parts

of chloroform and ether. A superficial vesiculation, followed by desquamation, is to be produced. In some cases Morrow uses Besnier's formula:—

R Chloral hydratis, 75 grains (5.51 grammes).
 Ätheris, 6 drachms (19.25 grammes).
 Acidi aceticici cryst., . . 15 to 75 grains (0.97 to 5.51 grammes).

M. These applications are repeated two or three times a week at first and later at longer intervals.

Between-times Morrow uses a stimulating oil, as of eucalyptus and turpentine, each half an ounce (15.5 grammes); crude petroleum and alcohol, each an ounce (31 grammes). The application of this oil is to be followed by a thorough massage of the scalp for five minutes by the patient. Once a week, or oftener, the scalp is to be thoroughly shampooed with tincture of green soap. At a later stage Morrow uses sulphur and resorcin ointments and salt-water douches. On the face he uses weaker solutions of acetic acid, or rubbings with a mixture of equal parts tincture of capsicum or tincture of cantharides and glycerin. Jaborandi and electricity he finds without effect. For alopecia of the body Morrow employs mercurial and tar soaps and sulphur baths.

A member of the *Wien. Med. Dokt. Collegium*⁸⁴ _{Aug. 15} cured a case of complete alopecia of the scalp, in a youth of 17, who had suffered from the disease since his third year, by local faradization, one pole being placed in the hand and the other on the scalp. Daily sittings of ten to twenty minutes were held, led to a partial cure in eighteen months or so, when the case was reported.

Chatelain⁸⁵ _{Dec. 1, 1880} paints the patches with iodized collodion (1 to 30), the application to be renewed once a week; 3 cases were cured in five weeks. The patches were small. It is supposed that the impervious coating formed by the collodion killed the microbes.

Beall⁸⁶ has used Martin's treatment of solution of bichloride of mercury, applied locally, and made to penetrate the follicles by the application of electricity. The disease, in Beall's case, affected the beard. I wish he had given some idea of the strength of the mercurial solution and of the battery-current, with the period of treatment. These details are trifling, but their absence is much felt by the practitioner, who may have a similar case.

ATHEROMA.

Török²⁴ has always distinguished dermoid cysts from atheromata. The former occur when sebaceous glands and hairs are wanting. They show no outlet, are closely connected with the surrounding skin, their walls are thin and vascular, and they are congenital, and most frequently observed in young persons. He now finds, however, that these distinctions do not always hold good, and especially that atheromata are not retention cysts, as usually supposed; atheromata, like dermoid cysts, are composed of wrongly-developed epithelial germs, and he thinks that milia are of the same nature.

Chiari²⁵ thinks there are two kinds of atheromatous cysts: one derived from the sebaceous glands and hair-follicles (to which comedones and milia belong), the other dermoid cysts derived from embryonal growths from the skin. The first show a wall of soft connective tissue, with numerous layers of thin epidermis-cells, with the invariable presence of an atrophic hair-follicle; growth in the cutis, from which they only later develop into the deeper parts; ubiquity being found at all points, except where there are no sebaceous follicles, and moderate size. The second develops in the structure of the skin itself. He proposes the names "follicular cyst" and "dermoid cyst," dropping the designation "atheroma."

ATROPHIA CUTIS.

Atrophy Maculosa et Striata Following Typhoid Fever.—F. J. Shepherd²⁶ gives a case of typhoid fever, occurring in September, 1889, with inflammation of both parotids, paralysis of the right facial nerve, paresis of the lower limbs, and fits of an epileptic character, with mild dementia. About the middle of November curious transverse colored stripes were noticed above the knees. They were purplish in color, elliptical, and parallel to one another. They resembled scars from burns. The skin was smooth and glistening, somewhat puckered transversely, and devoid of hairs. All the striae were perfectly sensitive; on passing the finger over them, they were felt to be depressed and the skin thinned. Shepherd gives references to other such cases following typhoid fever, herpes zoster, etc. Souques and J. B. Charcot²⁷ give the curious name of *géromorphisme cutané* (from $\gamma\eta\rho\omega\varsigma$, old age, and $\mu\sigma\rho\phi\eta\varsigma$, form or appearance) to an affection which, I think, must be classed

for the present among the atrophies of the skin, but with some regard for "dermatolysis," which it somewhat resembles. Our authors describe 2 cases, and give photographs, which we reproduce. Unfortunately, they were not able to obtain specimens of the diseased skin for microscopic examination, so we must content ourselves with a clinical description. The first case was a girl, 12 years of age, of normal stature and intelligence. Her mother thought the disease originated in a violent fright. Examination showed no eruption upon the skin, the peculiar changes in which showed themselves peculiarly upon the face, where the skin was soft, flabby, and pendent, as in an aged person. The features were effaced and flattened out, recalling the appearance presented in facial paralysis. The features were elongated and wrinkled, and there was a sort of dewlap under the chin. In form, its appearance presented was that of the mask of an aged person on the body of a young woman. The upper part of the thorax was affected in the same manner. The skin was wrinkled and creased, and in places slightly oedematous. The lower limbs were less affected.

A close examination of the skin showed no apparent alteration in its structure. There was neither thickening, induration, elephantiasis nor sclerodermic appearance. It seemed like a skin which had been simply distended by oedema, and which, in the subsidence of the latter, had remained wrinkled and too loose. (This case was one of Lallier's.) A second case coming under the direct observation of the reporters was that of a girl, 21 years of age, of neurotic temperament. The changes in the skin succeeded a severe fright, which she incurred at 12 years of age. This was followed by fever, with an erythematous-papular eruption, ill described, and which I can hardly think had a direct connection with the subsequent changes in the skin. It was shortly after she was well of this fever and eruption that the skin began to become shrunken and senile. This condition supervened very rapidly. It was said that in a fortnight the young girl had changed so that her friends scarcely knew her. Shortly after (May, 1881), the photograph (Plate XXI) annexed was taken in the Hôpital Saint Louis.

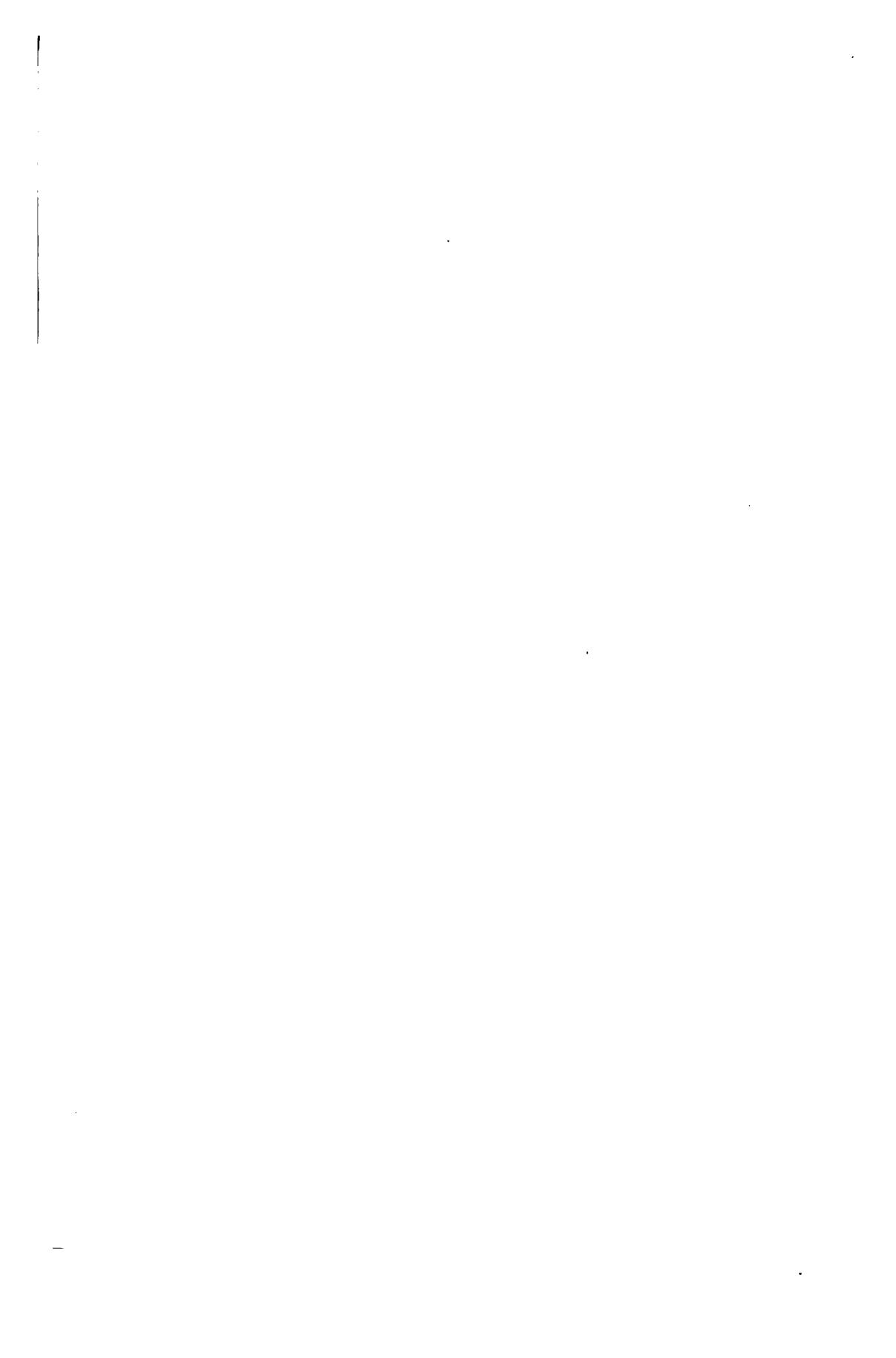
After a short stay in the hospital, where various forms of treatment were employed, without success, the patient returned

Séngle atrophy of the Skin (Souques and J B Charcot)

ARMANDINE S 11 YEARS OF AGE.

Nouvelle iconographie de la Salpêtrière

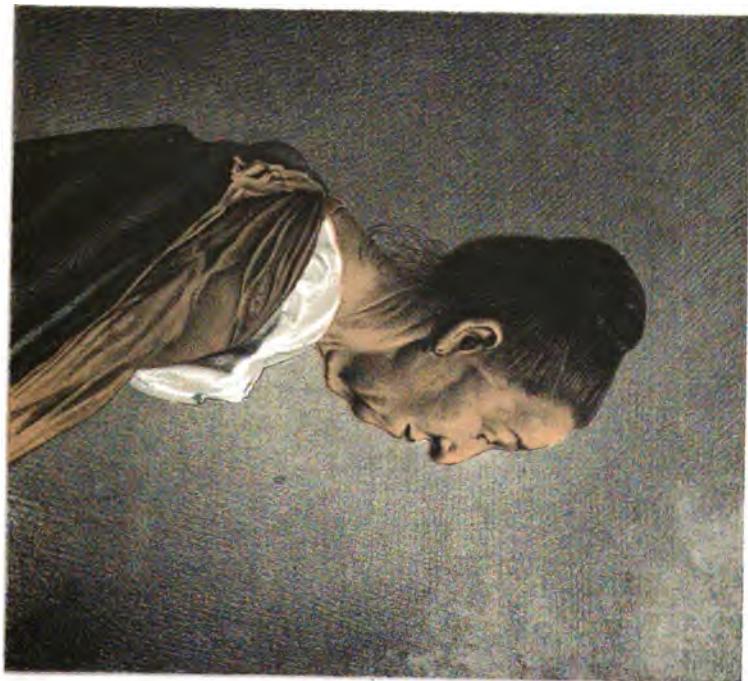
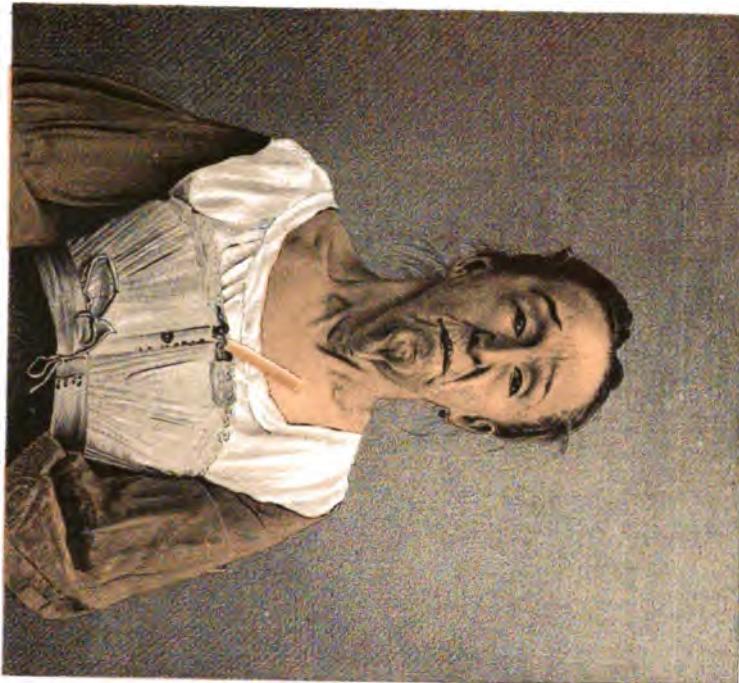


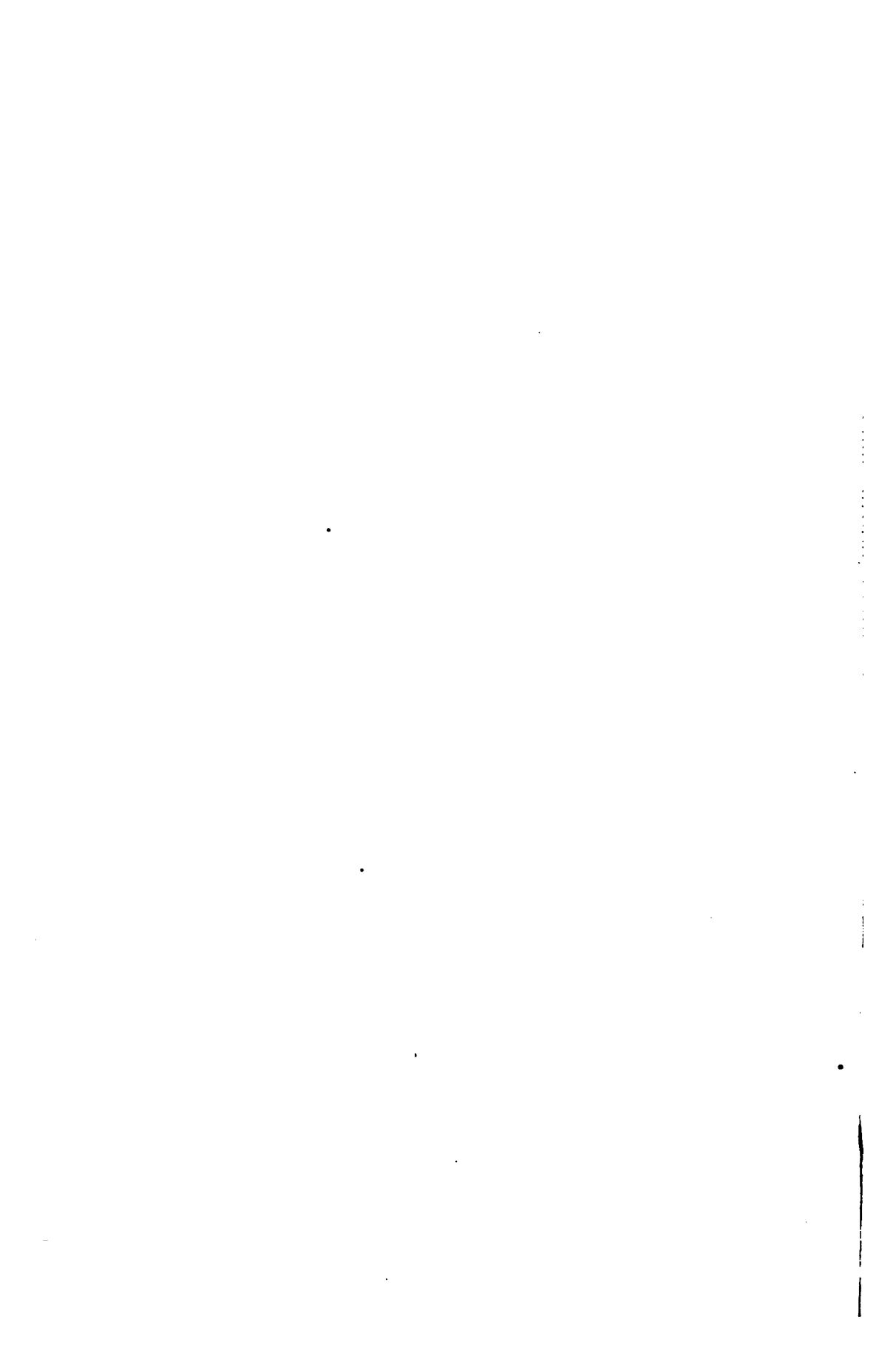


Senile atrophy of the Skin (Souques and J.B. Charcot)

ARMANDINE. 21 YEARS OF AGE.

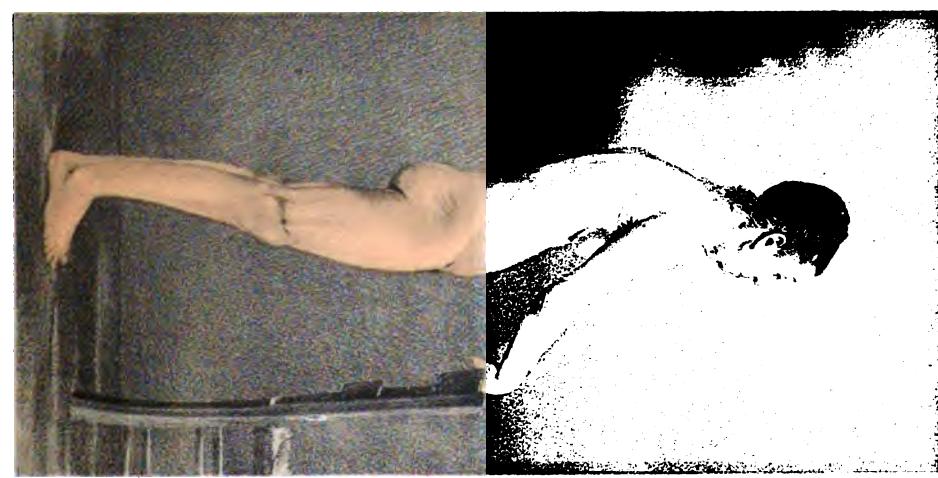
Nouvelle iconographie de la Scléropathie.

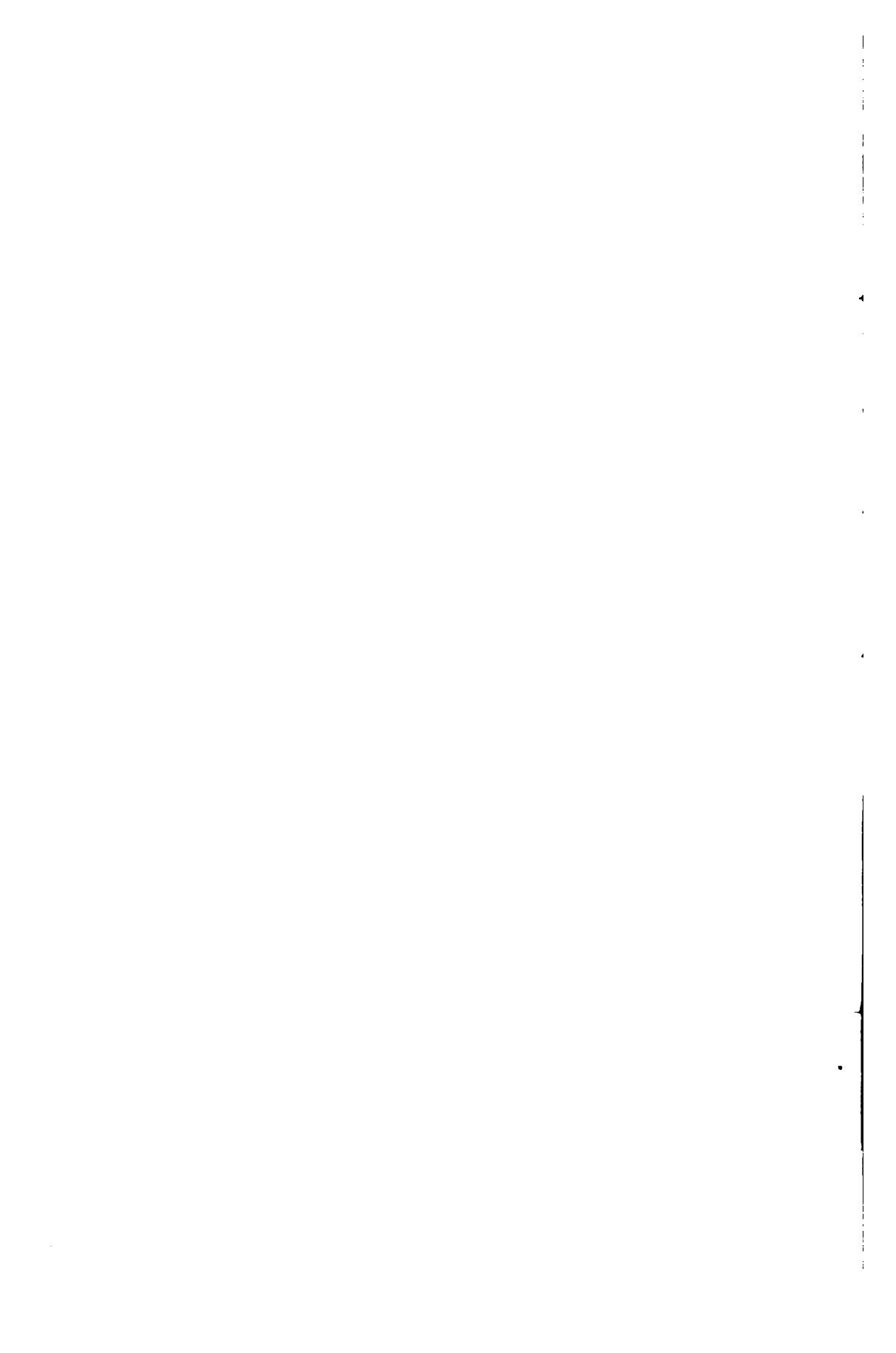




Senile atrophy of the Skin (Souques and J B Charcot)

ARMANDINE S. 21 YEARS OF AGE
Nouvelles Iénographie de la Salpêtrière





to her home. No symptoms having any significance were noted, excepting certain nervous crises, of a somewhat hysterical nature, which came on from time to time after menstruation was established. Her appearance, at the age of 21, was that of a young person, excepting that the senile condition of the skin gave an aged expression, only dissipated on a closer examination. Her mental faculties seemed normal; she was subject to fears, and very timid about her general health. Her muscular power was normal; cutaneous sensibility and special senses normal; electric resistance increased. The cutaneous surface, in its entire extent, was folded and creased, without other abnormality. This alteration was most marked about the lower part of the face, where the skin hung in long, flabby folds. About the mouth were numerous fine, converging folds, making this orifice resemble the mouth of a purse. The epidermis, hairs, nails, and glands were normal to appearance, but the sweat-secretion was markedly diminished. In addition to being abnormally thinned, the skin was also abnormally moveable over the subjacent tissues, resembling, in this respect, the skin in dermatolysis. The whole appearance of the skin was as if it had been made for a larger person. While this case is, so far as I know, unique in its totality, it must be classed with the cases of cutis pendulum and dermatolysis, on one hand, and with the various atrophies of the skin on the other. The plates accompanying need no further explanation.

DERMATITIS.

Dermatitis Venenata—Unusual Mode of Transmission.—J. Abbott Cantrell⁹ describes a case of dermatitis venenata conveyed to a patient in the obstetrical ward of a hospital by the attendants, who had, just before the patient's delivery, gathered a quantity of poison-ivy, and then, although having previously carefully washed their hands, had manipulated the patient's abdomen.

Dermatitis Congelationis.—Dixon¹⁰⁵ says that the immediate treatment of frost-bite should be to sustain the patient, restore the vitality of the part, and prevent the occurrence of moist gangrene. All local applications should be antiseptic. If the individual be discovered in an exhausted or comatose condition, he should be placed in a cold room, the temperature of which should be gradually raised. Artificial respiration may be required, friction applied to

the body, and stimulants and hot, nourishing liquids internally. In mild cases, rubbing with snow- or ice- water will suffice, but, when a large portion of the body is frozen, antiseptic ice-water should be rubbed in so as to aid the venous circulation, the temperature of the water being gradually raised, and circulation aided by stimulants, internally. After the circulation has been partially established, the limb, if that is the part affected, should be wrapped in antiseptic wool and elevated. If the surface becomes dark and gangrene threatens, lint, wet with iodine or corrosive-sublimate solution, may be applied, outside of which may be placed a dressing of powdered charcoal, prepared by putting the charcoal into a broad, thin bag, made of loose material. Additional heat may be applied to the part by warming the charcoal before applying it. These dressings should be frequently changed, and continued until the removal of the dead portion by nature or operation. In this way infection of the other parts will be prevented. Of course, the diet should be nourishing and supporting.

Dermatitis Herpetiformis (Duhring's Disease).—Jamieson ³⁶ used, in one case, nightly warm baths of starch and sulphide of potassium, followed by painting with a boric acid and calamine lotion, together with the internal administration of $\frac{1}{60}$ grain (0.0013 grammes) of arsenious acid, later reduced to $\frac{1}{30}$ of a grain (0.0026 grammes) in pill, thrice daily. Marked amelioration and final disappearance of the eruption followed, but a relapse occurred some months later. A second case was treated by alkaline baths, followed by sulphur ointment, together with the internal administration of arsenic with considerable benefit to the attack, but subsequent attacks were not prevented. The patient also gained relief subsequently by the use of sea-bathing. A third patient attributed his cure to the use of borax washes at night, with weak solution of permanganate of potassium in the morning. A fourth case, occurring in a child, was relieved by bran baths at night, followed by zinc-ichthyo-glycerin jelly, with syrup of the hypophosphites (Fellows's) internally. The case of another child is cited by Jamieson, when exclusive vegetable diet caused remission or disappearance of the eruption, which broke out again on every occasion when meat was given.

The sulphuret-of-potassium baths were composed of 2 ounces (60 grammes) of the salt, with 2 or 3 pints (1 to $1\frac{1}{2}$ litres) of

freshly-made starch to 30 gallons (120 litres) of water, at a temperature of 95° to 98° F. (35° to 36.7° C.). The water should not be too hot, and the baths were used for about fifteen minutes. The calamine lotion was mixed in the proportion of 6 ounces (180 grammes) to 1 drachm (3.38 grammes) each of boracic and carbolic acids, or of liquor carbonis detergens. Another soothing lotion to be employed after the bath is:—

The sulphur ointment, which seems to be particularly useful in the case of children, may be made as strong as 3 drachms (11.66 grammes) in the ounce (31 grammes). Schwimmer⁸⁴,_{nos. 18, 20} painted a patient twice daily with a 1-in-3 solution of thiol in water for three days, and, on washing this off at the end of three days, the eruption was found to have disappeared. Ravogli⁸¹,_{nos. 18, 20} finds arsenic of no account, but here he differs from most authorities. For my own part, I have certainly gained much advantage from its use, especially in connection with strychnia. Ravogli is inclined to think that ichthyol in 20-drop doses, thrice daily, does good. Externally, Ravogli has employed gelatin,—zinci mollis, with 2 per cent. of ichthyol,—with the result of calming the itching and burning. He also employs a lotion of equal parts ichthyol, glycerin, and rose-water. He thinks a well-regulated diet of the highest importance. Duhring⁵ says that no class of internal remedies is universally applicable. The treatment must be based on general principles. Milder preparations are required for the erythematous than for the vesicular or bullous form. Soothing preparations, as boric-acid, calamine, and oxide-of-zinc lotions, ointments, and pastes are of no value in this disease. Duhring thinks sulphur the most valuable of all local applications. He uses it in ointment, about 2 drachms (7.78 grammes) to the ounce (31 grammes), in all forms except the erythematous, where it proves irritating. It should be thoroughly rubbed in, and not merely smeared on. Liquor picis alkalinus is useful in some cases, especially in allaying the itching. It should be diluted about 1 drachm (3.75 grammes) to 8 ounces (240 grammes) of water. Liquor carbonis detergens,

an alcoholic solution of coal-tar, is also of use. It should be similarly diluted, though it may sometimes be employed as strong as 1 drachm (3.75 grammes) to 4 ounces (120 grammes) of water. Duhring has not found ichthyol, resorcin, thymol, or carbolic acid so useful as tar. Baths he has used with some benefit. Internally, Duhring has found arsenic of value, in which my experience agrees with his. He has, however, often found this drug to fail, and regards it as very uncertain. He thinks it may fail in some cases by not being given in large enough doses. In one case, however, over 40 or 50 minims (2.50 to 3.12 grammes) of Fowler's solution were given daily, which seemed for the time to partially control the bleb formations, but the result, on the whole, was not beneficial. Duhring thinks that quinine and strychnine do not appear to have much control over the disease, but I have found that, when combined with arsenic, the combination is certainly of value in the milder cases. Iron, ergot, and codliver-oil have a limited and uncertain value. Duhring thinks that the hygienic influences of change of air and scene should be employed when practicable.

ERYTHEMA.

Universal Erythema Multiforme.—Duhring²⁴⁵ gives the case of a man of 29, admitted to the hospital for unilateral rheumatism of the ankle and knee-joint. The temperature was 101° F. (38.3° C.), and there was general malaise, headache, etc. The following night an eruption suddenly manifested itself on the flexor and extensor surfaces of the arms, on the face, back, chest, and palms, but not on the backs of the hands. The patches were erythematous, pea-sized, ill-defined, and very numerous, and were itchy from the beginning. The eruption continued to spread over the general surface, and four days later attacked the mucous membrane of the pharynx. The rheumatic pains subsided after the efflorescence began to appear. General desquamation set in two weeks after the first appearance of the eruption, having been preceded by a change in the character of the lesions, the characteristic patches of erythema multiforme giving way to a generalized eruption of numerous minute, yellowish-grayish, superficial vesicles, such as are met with in scarlatina. Large, exfoliative patches of skin were thrown off, with glove-like casts of the hands and feet, similar to the exfoliation of dermatitis exfoliativa. The duration of the

whole disorder was about three weeks. Duhring regards the case as instructive in showing the close relationship of the various forms of erythema.

Erythrasma.—Pasquale de Michele,⁵³⁷ in an article on this subject, reviews the work of former observers and gives the results of his own researches, which lead him to the conclusion that this affection is quite distinct from the other dermatomycoses, and is due to the microsporon minutissimum.

HERPES.

Chronic Recurrent Herpes of the Oral Cavity.—Flatau⁵³⁸ says that this is a rare disease, difficult of diagnosis and hard to cure. He gives the case of a man of 38, healthy until his eighteenth year, when, after an attack of typhoid fever, in 1874, the herpetic trouble began to show itself,—at first upon the lips and along the gums, later on the tongue. The eruption lasted from eight days to four weeks. In 1888 and 1889 for nearly a year the patient was free from herpes. After this, however, the attacks recommenced with greater frequency, sometimes immediately following one another. The tongue seemed more and more the seat of the eruption, and the patient complained of difficulty of breathing through the nose during the attacks. No general symptoms accompanied the attacks; the pharynx and larynx remained free. Salivation was a marked symptom from time to time, and the mucous membrane of the cheeks was attacked. In 1887 similar herpetic lesions began to appear on the scrotum, coinciding with the appearances in the mouth, and later some lesions appeared on the penis. Examination into the patient's history seemed to exclude constitutional disease and also gastric troubles as a cause. The immediate cause of the affection seemed to be some involvement of the trigeminus.

HERPES ZOSTER.

Herpes Zoster of the Superior and Inferior Maxillary Nerves.—Picot,⁷⁰ in a clinical lecture, gives the case of a girl of 17, who, a few hours after exposure to cold, was seized with malaise, headache, and vertigo, followed by severe intermittent pain in the upper and lower jaw of the left side. The next day small red papules appeared on the cheek near the point of exit of the

maxillary nerve, and later on the same day similar lesions showed themselves over the tragus of the left ear and at the angle of the mouth and eye. At the same time the patient experienced pain in the throat, with difficulty of deglutition. Within twenty-four hours vesicles had formed at these points. On admission to the hospital (on account of the persistent neuralgia), three weeks later, the lesions still persisted. There were no enlarged glands. Examination of the oral cavity showed herpetic vesicles on the buccal mucous membrane and the anterior palatine fold to the left of the median line. Similar vesicles could be seen on the left side of the soft palate and pharynx. There was no loss of sensation over the skin of the affected parts, but some hyperæsthesia. The senses of taste and smell were unaffected. There was no fever or any disturbance of the system generally. A few days after this examination the external lesions had begun to dry and become crusted. The pain, except a general headache, had disappeared, but the throat continued sore. The tongue, which had all along been thickly coated, peeled off, and showed a raw, red surface with some vesicles on the anterior two-thirds of the left side. Antipyrin was administered, with the effect of relieving the headache, and the pain gradually disappeared from the throat, all the lesions gradually healing up. Twelve days later, and about a month from the commencement of the attack, the patient had quite recovered.

Picot calls attention to the fact that the superior branch of the trigeminal was entirely unaffected. Usually zoster occurs along this branch alone. He quotes several analogous cases of considerable interest. As to the etiology of herpes zoster, cold, excessive drinking, injury, as in extracting a tooth, the extension of neighboring inflammation, the pressure of a tumor, asphyxia from coal gas, moral shock, the administration of arsenic, and the application of electric currents have been noted as causative. Lesions of the nerve-centres have also sometimes been noted, and the herpes here may be regarded as a trophic disturbance analogous to the bed-sores, œdema, "pemphigus," and joint troubles observed under similar circumstances. In myelitis of the cord, locomotor ataxia, spinal meningitis, cancer of the spine, and Pott's disease herpes zoster has been noted.

Picot alludes to the observations made in some cases of diseased nerve-ganglia and to the occurrence of zoster in tubercu-

losis of the lungs with involvement of nerve-ganglia. The peripheral nerves also have been observed to be affected in some cases of herpes zoster, and Picot quotes a number of cases of this sort of thoracic zona, very interesting in connection with the observations of Curtin, cited elsewhere in this review; but I fail to note any observation concerning the condition of the nerves *within* the thorax. Of recent years a new theory of herpes zoster has been advanced, namely, that it is infectious in its origin. Picot quotes authorities on this point. In ordinary cases of herpes zoster, little medication is needed. When there is severe pain, injections of morphia, blisters over the point of convergence of the nerves, or the continued electric current may be employed. Antipyrin, I may add, appears likely to be useful in some cases, as already noted.

Henri Fournier,⁴⁹ in a paper on *zona of the mucous membranes*, traverses the same ground as Picot, but gives additional facts. *Herpes zoster ophthalmicus*, followed by epistaxis, is reported by a French writer.⁵⁰ It was supposed that vesicles had formed within the nasal cavity.

Weiss⁴⁵ writes on *epidemic herpes zoster*, with numerous cases and references, considering the affection as an infectious neuropathy, prevailing epidermically under the influence of climatic conditions not as yet understood.

Byron¹ describes the case of a child suffering from reflex epileptic convulsions, which supervened upon an eruption of herpes zoster, occurring in the distribution of the superior superficial branches of the cervical plexus, the left side of the head, neck, shoulder, and upper part of the thorax being affected. With the disappearance of the eruption the convulsions ceased.

Casey A. Wood⁵¹ describes *herpes simplex and zoster of the face and cornea*, with special reference to the eye-symptoms and various references to authorities.

Mackenzie⁵² reports an interesting case of *multiple symmetric herpes zoster*, affecting the face, chest, axilla, shoulders, and thighs, accompanied by tenderness along the spine, severe neuralgia, and, to some extent, recurrent.

Pugliesi⁵³ describes a case of *general febrile herpes zoster*, where, with febrile symptoms and pains in the limbs, there developed, on the tibia, knees, forehead, neck, and sacrum, reddish, confluent patches, and a few days later high fever and delirium, with

well-marked herpes zoster. The lesions were bilateral and affected also the thorax. The eruption ran the usual course.

Hutchinson², reports a case of herpes zoster of the forehead, in which the oculo-nasal nerve escaped. If this is affected, as I think it usually is, the herpetic vesicles will appear on the eyeball and on the tip or side of the nose.

Adenot³² describes a case of herpes zoster of the back of the thumb and on the skin covering the carpo-metacarpal joint of the right hand, accompanied by hyperæsthesia, pain and paresis of the arm, occurring during an attack of measles. The symptoms were referred to the radial and circumflex nerves. The occurrence of the zona was due to the poison of the measles, and was therefore comparable to the paralysis accompanying this disease and described by Landouzy and Dénarié. There was no paralysis of any muscles left behind.

Under the title of "A Case of Herpes Zoster, Complicated with Erysipelas and Gangrene," Wetzel¹⁵⁶ gives an account of an interesting case of zoster ophthalmicus frontalis, with severe symptoms. I do not think he makes out the presence of erysipelas, but the herpes zoster alone was bad enough. It does not appear that the eyeball was affected, the oculo-nasal twig, therefore, escaped.

Curtin,⁷⁰ under the title "Is Herpes Zoster a Cause of Pleurisy and Peritonitis?" refers to several cases coming under his own observation, where pleuritic "catching" pains, with, in some cases, the physical auscultatory signs of pleurisy, coincided with the eruption of thoracic herpes zoster. He also describes a case, coming under his care, where local peritonitis occurred just under the seat of an abdominal herpes zoster, and proposes as a solution the simultaneous inflammation of the corresponding internal and external nerves. As herpes zoster of the mucous membranes is well known, it would seem not unnatural that the herpes zoster of the serous membranes may also exist. Curtin's very suggestive paper deserves careful consideration, and I must say I am surprised that among the enormous number of observations of herpes zoster, yearly published, similar facts have not heretofore been noticed.

Hutchinson⁸⁰⁶ publishes "A Case of Very Severe Herpes Frontalis, Occurring in a Gentleman who was Taking Full Doses of Arsenic." This is one more of the numerous cases of this sort which have been published of late years, and, notwithstanding the

enormous number of cases of herpes zoster which occur in persons who are not taking arsenic, and the still greater number of individuals who are taking arsenic without suffering from herpes zoster, I must confess that my long-established skepticism as to the occurrence of herpes zoster as an effect of the ingestion of arsenic is beginning to be a little shaken. Byrd Harrison ⁸¹ gives the case of a patient of his, who was imprudently treated by an ear-specialist with 1-drop doses of Fowler's solution for five weeks, after which a right thoracic herpes zoster broke out. Harrison is not sure that the arsenic caused the zoster, but says that the case serves to illustrate the impropriety of the specialist usurping the part of the attending physician and prescribing general treatment for a patient of whose constitution he necessarily knows nothing. But it seems to me this is a fallacious conclusion, for even the general practitioner, if he is to increase his practice, must sometimes prescribe for new patients, "of whose constitution he knows nothing."

Fränkel, ²¹¹ on examining the liquid from the vesicles of an orbicular herpes zoster, found two kinds of staphylococci,—one presenting white colonies, the other yellow. They seemed both to be *staphylococcus aureus*. Inoculations upon rabbits gave colonies in the blood, but, although the yellow staphylococci had been inoculated, the new colonies were white. No symptoms similar to those of herpes zoster were produced.

Treatment of Herpes Zoster.—A writer ¹⁰⁰ says that the treatment of this affection should have three objects: (1) the eruption; (2) the neuralgia; (3) the general condition. Under the first head, we must endeavor to prevent the rupture and ulceration of the vesicles, which result in increased pain and prolongation of the disease, as well as, sometimes, in ugly scars. Neither caustic, stimulating, nor moist emollient applications should be employed. A light inunction with oil or vaselin, followed by powdered starch mixed with subnitrate of bismuth, or oxide of zinc, boric acid, or opium, and kept in place by raw cotton and a bandage, may be employed. Cocaine may be applied in proper cases. The crusts can form without danger of being rubbed off under this dressing, and a warm bath will remove them when ready to come off.

In some cases ulceration takes place, in spite of all that can be done. In such cases the dry dressing is out of place, and caron-oil, with laudanum, applied on fenestrated linen rags, or

glycerole of starch may be applied. Antiseptics are not required for the eruption, but applications must be kept aseptic. When gangrene takes place, however, of course carbolic lotions, etc., must be freely used. Championnière's powder, composed of equal parts of powdered benzoin, iodoform, carbonate of magnesium, and powdered gray cinchona, moistened to saturation with tincture of eucalyptus, forms an excellent antiseptic dressing. These are the cases where strong tonic and supporting treatment is required.

HERPETISM.

Lancereaux¹⁴, revives this curious expression, which, he says, describes the state of persons subject to herpes. An illustrative case was that of a young man of 31, coming to the hospital for chronic rheumatic pains, and displaying a series of diverse affections,—migraine, ciliary blepharitis, granular angina, etc. Repeated attacks of articular rheumatism had led to crackling and swelling of the joints. His heart was not affected, but the arteries were hard and tense, like those of an old person. A second patient, a young man of 33, was infirm and impotent. Here the diathesis was hereditary. His father was bald at an early age; "migrainous," hæmorrhagic, hernial. He had died at 63, of asthma and heart disease. His mother was obese and "migrainous," and died, at 52 years, of one of the most frequent accidents of arterio-sclerosis,—cerebral hæmorrhage. This patient had arthritis deformans. The other organs, including the heart, were sound. The history of this patient shows that his troubles originated in a disorder of the central nervous system, which alone could be called strictly hereditary.

Another patient, a man of 52, presented, according to Lancereaux, a complete picture of the condition he is endeavoring to depict. His father, who suffered with chronic rheumatism, died at 68; his mother, obese and asthmatic, died at 58. The patient suffered from epistaxis from his 13th to his 18th year, but had not had migraine. Lancereaux believes the two affections due to the same cause,—a lesion of the vasomotor nerves leading to vascular dilatation, in one case giving rise to hæmorrhages, in another to nerve-pains.

The patient began to grow bald at 25, the bald region corresponding to the distribution of the frontal nerves. From the

age of 30 various lesions began to appear, of the most diverse character. The knee-joints crackled, showing lesions of the cartilages; the finger- and toe-joints were swollen; the toe-nails showed transverse ridges. The skin of the legs showed scattered varices, and was thickened in places, and pigmented. The arteries were hard, the heart hypertrophied. There was, also, an old umbilical hernia, ciliary blepharitis, and, finally, the patient had, for a long time, been bronchitic, emphysematous, and asthmatic. After having had gravel, he became obese at 30 years of age, and at 35 sugar was found in his urine. These symptoms increased with age.

Lancereaux's fourth patient was a man of 58, who showed marked hepatic symptoms. He was "varicose," chronically and deformedly rheumatic, haemorrhoidal, suffered with hernia, and showed adhesions of the vertebræ.

With these patients before him as a text, Lancereaux goes on to describe the affection. He says that he often is able to make his diagnosis in school-boys. From youth the individual predisposed to this affection shows its symptoms. Erythematous or papular eruptions, always itching in character, and to which the name urticaria is apt to be given, and hepatic and vesicular eruptions, as eczema, often accompanied by scratching, crusts and insomnia, are characteristic. Later, slight convulsive attacks, a tendency to spasmodic croup, due to mobility of the nervous system, and later still, in childhood, attacks of sneezing, or even of asthma, are common. Sometimes the eruption is haemorrhagic, a symmetrical purpura of the legs, ordinarily. Lancereaux was called to see a case of this kind in a child 8 years of age, which was supposed to be of grave import; but, knowing the little patient's antecedents, he considered it merely a vasomotor neurosis, and gave a favorable prognosis, which the event justified. At the approach of puberty, various disorders, induced by exaggerated reflex excitability, show themselves in the victim of the herpetic diathesis. Such are incontinence of urine, involuntary spermatic losses, epistaxis, haemorrhoids, and even haematuria. At the same period, granular angina, ciliary blepharitis, migraines, and, more rarely, acne, supervene. Finally, a peculiar, flatulent, acid dyspepsia, with or without dilatation of the stomach, and almost always accompanied by hypochondria, appears. A little later, in

early maturity, trophic troubles show themselves, usually involving the epidermis, the hair of the scalp, and the nails. Pityriasis with atrophy of the hair of the scalp-bulbs may then occur, resulting in baldness. In the lower limbs thickening pigmentation and desquamation of the epidermis. The nails show transverse lines, sometimes thickening and desquamation, and more or less complete destruction. Although usually dry and thin, the herpetic individual may be obese. In the latter case, renal disorder, glycosuria, etc., follow. Digestive disorders, green and loose stools, or constipation occur. In women, fragments of coagulated albumen (the so-called membranous enteritis) are passed.

The articular troubles may come at any period of life. Pulmonary emphysema, tracheo-bronchitis, etc., supervene after middle life. Finally, arterio-sclerosis or generalized endarteritis may supervene. This latter lesion, frequently associated with varices of the limbs, causes the arteries to become knotty and irregular, with loss of elasticity, resulting in a more or less marked cardiac hypertrophy, which is in some sense compensatory. This condition may lead to brain trouble, but unless the arterial condition shows itself heretics are generally long lived, though the articular lesions may render them helpless.

I have given this account in full on account of Lancereaux's great distinction as a clinician, but I do not think I can see here a distinct picture of any one diathesis. The nearest approach to it is what we call the gouty predisposition. As regards the bearing of this condition on the various obscure conditions of the skin noted, I think it remains for future observation to confirm or refute Lancereaux's ideas. He says he does not cling to the name "*herpétisme*." What he insists upon is a marked vasomotor and trophic neurosis, vasomotor when it produces "fluxions of the skin," of the mucous membranes, the articulations, etc.; trophic when it gives rise to osteophytes, aponeurotic and tendinous retractions, arterio-sclerosis, etc. All these affections are similar to those produced in the course of certain affections of the nervous system, whether traumatic or spontaneous, such as wounds of the nerves or material lesions of the nerve-conductors or centres. Lancereaux thinks it is easy to distinguish cases of this disease. One of the symptoms being present will suggest looking for the others. The cutaneous eruptions are almost symmetrical and are pruriginous. The prognosis is

not grave when patients escape the arterial lesions. The treatment should be directed to general building up of the economy. Quinine, antipyrin, bromide of potassium, and morphia come into play for the nervous lesions, but Lancereaux places his chief dependence upon hydro-therapeutics.

LEPROSY.

Involvement of the Peripheral Nerves in Anæsthetic Leprosy.

—Dehio²¹ alludes to the fact that since Danielssen and Boeck's time, the changes in the skin, connected with leprosy, especially the occurrence of anæsthetic patches, have been ascribed to trophic nerve-influence, resulting from invasion of the nerve-trunks, leading to the affected skin by the primary leprous affection. Dehio, however, says that the leprous skin-spots do not correspond to the distribution of the nerves, but may spread in all directions. He has, therefore, undertaken an examination of the peripheral nerves to their finest ramifications. The results of previous examinations on the clinical symptoms of leprous invasion of the nerve-stems supplying the skin and muscles of the hand were described by the author in the same journal.²¹ Dehio's patient suffered with degenerative atrophy of the nerves of the skin and muscles of the hand, particularly in the parts supplied by the ulnar nerve. He concluded, from his examination, that certain peripheral branches of these nerves were themselves affected, and had called forth independent disturbances in their special area of distribution, which could only be explained as resulting from chronic degenerative neuritis ascendens leprosy.

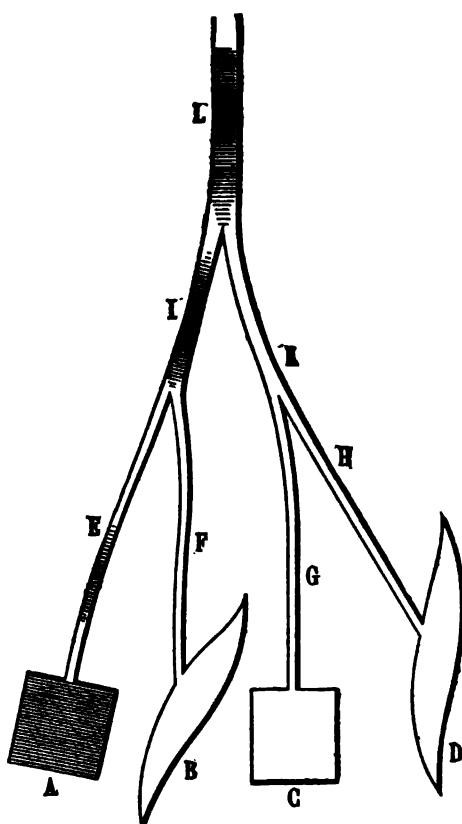
The patient having died suddenly from paralysis of the heart, following alcoholic excess, a careful post-mortem examination was immediately made, especially of the spinal cord, two anæsthetic patches from the scapular region, including the neighboring skin, and the nerves nearly to the cord. The right ulnar nerve, from the axilla to the fingers, including the skin and some of the muscular interossei, was also prepared for microscopic examination. The result of this examination demonstrated that Dehio's view was correct. He shows by a diagram how the disease may originate in the skin, affect the nerves; then, being distributed, and ascending these nerves, may produce trophic disturbances of other areas of skin.

The accompanying schematic drawing demonstrates Dehio's

views. It represents a mixed nerve. A and C are portions of skin with their sensory nerve-twigs, E and G; B and D are muscles with their motor nerve-twigs, F and H; I and K are mixed nerve-fibres, while L represents the nerve-trunk. The shaded portions represent the localities of leprous infiltration.

The patch of skin, A, being infected with leprosy, and becoming anæsthetic without involvement of the nerve, E, subsequently

an ascending degeneration attacks the nerve-fibres of E and proceeds toward I. After a long time the leprous infiltration also reaches E, but does not produce any clinical change. So soon, however, as the mixed nerve, I, is reached, all peripheral to that becomes atrophied, and we have degenerative atrophy of the muscle, although neither it nor the motor nerve reaching it has been attacked by leprous infiltration. When, finally, the leprous infiltration creeps up and localizes itself at L (as in Dehio's case it did, in the ulnar nerve, at the elbow), the whole nerve below this point becomes atrophied, including K, G, and H, which, nevertheless, are free



from leprous infiltration. The result is: anæsthesia of the patch of skin, C, which itself is not affected with leprosy, and degenerative atrophy of the muscle, D. The fact is, that we find clinically, in anæsthetic leprosy, not only that the leprous patches lose sensibility, but, also, that apparently healthy portions of skin, particularly in the extremities, lose their sensibility and become anæsthetic and hyperæsthetic.

Histological and Bacteriological Research in Leprosy.—Gianturco¹⁰⁰⁹ found lepromata to contain large numbers of bacilli. Their creation and relationship to the cellular elements of the tissues vary during the period of the morbid process. In recent cases the bacilli are almost all present in the cellular elements. Later they multiply, forming a globular mass, and the cell becomes gradually destroyed, freeing the bacilli. With the juice of a cutaneous, non-ulcerated leproma, Gianturco made inoculations on blood-serum and on glycerin-agar, the tubes being kept at a temperature of 37° C. (98.6° F.). Cultures developed in all the tubes. Growth was arrested at 20° to 25° C. (68° to 77° F.). These results agree with those of Bordone-Uffreduzzi, but Campana has devoted much time to the matter without having been able to cultivate the bacillus lepræ.

A Case of Generalized Nerve Leprosy Simulating Syringomyelitis.—Thibierge,^{8,18} at the *Société Médicale des Hôpitaux*, alluded to a case of Rendu and Babinski, which appears to have gone the rounds of the Parisian hospitals, being sometimes called syringomyelitis and sometimes leprosy. The symptoms were found of both diseases: atrophy of the smaller muscles of the hand, the muscles of the forearm; cutaneous disorders of a trophic character, as *malum perforans pedis*; disturbances of sensibility, as absolute thermo-anæsthesia, with almost entire analgesia and slight tactile anæsthesia.

The prolonged sojourn of the patient in Tonkin was in favor of leprosy; also the bilateral paralysis of the orbicularis palpebrarum, and particularly of the peripheral nerves. In particular, the tumefaction of the ulnar nerves above the elbow, a nodular neuritis, was pathognomonic of leprosy. The disturbances of sensation in this case should not cause us to reject the idea of leprosy, for the most characteristic disassociation of the different forms of sensation is not characteristic of syringomyelitis, Charcot having met with it in hysteria, Quinquaud in leprosy, etc. In any case, this observation of Thibierge shows that we must take account of leprosy in the diagnosis of cutaneous and amyotrophic diseases. Leprosy is generally supposed to be uncommon in France, but Thibierge says that it is, on the contrary, quite common; at least, in Paris, though no cases originate in that city.

Leprosy Complicated by Cancer.—Sydney Browne Swift, resi-

dent physician, Leper Settlement, Sandwich Islands,¹⁴⁷ gives an advanced case of leprosy, in which a rodent ulcer developed in the face and carried the patient off, in spite of the somewhat mild treatment instituted by the physician. The concurrence of the diseases is of interest.

Duhring¹⁴⁸ records a case of leprosy in a Norwegian, occurring in or near Philadelphia. The case presents no marked features, except that, being of the anaesthetic type, the patches resembled those of morphœa. This is the third case of leprosy observed in Philadelphia within the past eighteen months, I believe. The other 2 cases were Chinese.

Outbreak of Leprosy in New Caledonia.—Legrand²⁰⁸ describes the appearance and spread of leprosy in this French colony. Leprosy, it is certain, was unknown to the aborigines. In October, 1880, the word "leprosy" was first officially pronounced. In 1883 numerous lepers were reported in the north of the island, and Brassac advised the establishment of a leper settlement; but, in spite of the physicians' repeated reports, the government did nothing from 1883 until 1888, when Forné, physician-in-chief, endeavored to excite official interest by reporting the existence of hundreds of cases. The expense and difficulty of forcibly segregating the lepers still deterred the government, and it was not until two years ago that a plan was adopted for segregating lepers. Seventy are now in the asylum. The rapid spread of the disease points unquestionably, in Legrand's view, to its transmission by contagion.

Transmission or Contagion of Leprosy.—Arning,^{45, 147} the great Sandwich Island authority on leprosy, read a paper before the International Congress at Berlin last year, in which he said that the great point in the question of the transmission of leprosy is whether this is by heredity or contagion. He took it for granted that all believed leprosy to be an infective disease, and that the bacillus of Hansen and Neisser is the infective agent. We do not, however, know how it enters the body.

The term heredity is an evasion of the real question. In syphilis, the type of a hereditary disease, we find all grades of direct hereditary transmission, from the foetus dead *in utero* or the infant born with, or showing shortly after birth, manifestations of the disease, up to those where parental disease causes only more or

less lowering of health in the children. There is nothing of the kind in leprosy. There is no disease of the foetus, and rarely any of the infant, and there are no characteristic signs, as in syphilis, to distinguish hereditary from acquired leprosy.

Lepers, male and female, suffer from marked deterioration of the genital functions, and Arning says that male lepers soon become impotent. From this assertion he deduces the conclusion that leprosy is unlikely to be carried on by inheritance. I think, however, that Arning's experience is not corroborated by that of other observers. The reports before me, of various observers in different countries during the past year, contain a number of observations of cases where lepers have married repeatedly and procreated a number of children until they have reached an advanced stage of the disease.

Arning says that leprosy is a family disease, and that children of lepers more easily acquire leprosy by early infection. He thinks this conclusion less forced than the idea of a supposed heredity, with an undefined latent period. Against this view I must place again the observations of Zambaco and others, where the children of lepers have been immediately removed from their surroundings, and have been brought up among healthy people, and have yet developed leprosy. It seems to me that in the study of this disease much account must be taken of the current literature of the subject. No one observer, however great his opportunities, can expect to embrace an entire knowledge of the subject, and a real advance in our views of leprosy can only be gained by a comprehensive examination of the many excellent reports emanating from all parts of the world. Another point taken up by Arning is the question, Has leprosy been spread in the Sandwich Islands by vaccination? Leprosy was first introduced into the Sandwich Islands in 1830, but the rapid and enormous spread of the disease which occurred in 1855 coincided with a severe small-pox epidemic. Hillebrand thought that the leprosy was then diffused through the influence of vaccination; but Arning reminds us that, though leprosy had been slowly spreading since 1830, by 1855 a new generation was springing up and spreading the disease from their own families. The influence of emigration, especially Mongolian, must also be considered. A remarkable increase of leprosy cases occurred in Lahaina-on-Main, in 1871 and 1872, about a

year after a very careless arm-to-arm vaccination. Some 50 or 60 cases suddenly appeared in this district, which, until then, had been comparatively free from the disease. Arning found, in investigations connected with vaccination, that the apparently sound skin of lepers sometimes contains lepra bacilli.

On the other hand, Ashmead maintains that if leprosy were spread by vaccination it should be widely diffused in Japan, where tattooing is so much in vogue. Ashmead suggests mosquito-bites as a probable means of spreading the leprosy contagion, and Arning admits the attractiveness of this theory. He has, however, examined the blood contained in mosquitoes recently gorged with leprous blood, but without finding the bacillus lepræ. It will be seen, however, on referring to my report in the ANNUAL, a year or two back, that repeated examinations have failed to show bacillus lepræ in the blood-current of lepers, excepting in the immediate neighborhood of lesions. It might very easily be possible for a hundred mosquitoes to draw blood from a leper without also drawing in a single bacillus, while a single one, perchance, might become the intermediate pest of the contagious principle. This point, I think, will require extended research before it can be considered settled. Arning refers to his inoculation experiments on a condemned criminal. These were supposed to be successful until it was found that the nephew, a cousin, and the son of the criminal turned out to have been lepers; so that the experiment was vitiated. Arning has always been reserved regarding the results of his intercalations on Keanau; but other writers on the subject have been less reticent, and have claimed it as conclusive.

What we really want at present, concludes Arning, in order to prove conclusively the contagiousness and inoculability of leprosy, is some positive means of proving the vitality of lepra bacilli. The impossibility of proving, in any particular case, whether we have to do with living or dead bacilli is, undoubtedly, the rock on which all previous investigations have been shattered. It would be a great advance if we could, in some way, prove, for instance, the viability of the lepra bacilli found in the fæces in cases of intestinal leprosy, or if we could show that those found in bodies, after years of putrefaction or maceration, were capable of being infective agents.

The Heredity of Leprosy.—Armauer Hansen,³⁶ the discov-

erer of the bacillus *lepræ*, refers to the fact that he has always combated the view that leprosy is hereditary, holding that a specific disease can never be hereditary. Hansen recently visited the Norwegian settlements in Minnesota, with the view of examining the facts regarding leprosy as there found. He says that if leprosy were hereditary, a large portion of North America might now be found afflicted with it (I presume he means a large portion of the Norwegian inhabitants); for, not only are the materials for inheritance there available among the Norwegian immigrants, but, also, among the relatives and direct offspring of lepers. Hansen, in his original paper, gives a catalogue of all known lepers, with notes of some cases. Among all these cases of Norwegian lepers in Minnesota—156 in all—*not one was born in America*, although a number developed the disease long after their arrival in this country. Many have had numerous progeny, none of whom, however, have had the parental disease. Of the 156 lepers settled here, only 12 to 14 are now dead. It is, indeed, strange that these lepers have not communicated the disease by heredity or contagion. Hansen thinks it is because their habits in the old country were so slovenly, and they herded together; whereas here, in America, they become cleanly and live a less promiscuous life. Each of the lepers Hansen saw in Minnesota had his own bed, and even his own room.

In an analysis of 118 cases of leprosy in the Punjab, by Gulam Mustafa, read by Abraham before the London Epidemiological Society,¹⁰⁹ 73 cases married before the onset of the disease, viz., 43 males and 30 females; and, while still healthy, the males had 71 children, mostly now living and free from the disease, and the females had 65; total, 136. Only 4 females gave birth to offspring,—5 in all after the disease had declared itself. Sixteen males and 23 females married after leprosy had declared itself. Seven married more than once; thus, one man married five wives in succession, and several others married two or three times. The men contracted 26 marriages, the women 29. Only 5 men proved prolific, with 10 children, and 8 women with 15 children. Four children are dead; so that we have left 21 as the progeny of 55 marriages.

The statistics do not give names, so that they are only to be relied upon in part; but are suggestive as indicating a marked

comparative sterility, and, in part, bearing out Arning's statements quoted in an earlier page of this review.

Preventive and Antagonistic Inoculation in Leprosy.—Beaven Rake, the Trinidad authority on leprosy, says² that, after attacks of variola, some, at least, of the tubercles of leprosy have been known to disappear. He has observed the same effect follow the vaccination of lepers. Hardy mentions pleurisy and pneumonia as acting similarly. Leloir also describes erysipelas as retarding leprosy; and Rake says that he has observed the same in Trinidad. Leloir also mentions the disappearance of cutaneous tubercles when the patient is attacked with phthisis. This is very marked toward the end of old, tuberculated cases in Trinidad, and, on post-mortem examination, Rake has found tubercles not only in the lungs, but often, also, in the other viscera. The connection between leprosy and tuberculosis he hopes to discuss in a future report. All these instances of the retarding effect of other diseases on leprosy seem to point to the possibility of antagonistic inoculation; for each of the diseases mentioned are connected with a distinct micro-organism.

Cornil has injected jequirity into leprous patches without effect. Campana inoculated lepers with erysipelas, with the result that nearly all the patients in the ward got erysipelas, and the ward had to be closed. No effect was produced on the progress of the leprosy. In view of this apparent antagonism, Rake has been making some experiments in the treatment of leprosy by inoculation of cultures. As we are not yet certain that the bacillus lepræ can be grown on the ordinary media, protective or antagonistic inoculation may seem somewhat premature. Still, Rake has thought it worth while to take a working hypothesis, and go a little ahead of our actual knowledge, for the cultures from fragments of tubercles or viscera might contain either spores or some secretion of the bacillus, and so set up some recognizable changes when injected beneath the skin. Even if the growths are not leprous, they may be of value in destroying leprosy bacilli, for Campana has described relief in phthisis from the inoculation of the bacterium *termo*. There might be, says Rake, three conditions in which such inoculations might be of use: (1) in anæsthetic leprosy, to arrest further growth in the nerve; (2) in tubercular leprosy, to cause local destruction of the tubercles, or to protect

against further growth; (3) in leprotic fever, to arrest the outbreak of tubercles.

In the first series of cases, Rake has found temporary swelling, redness, and sometimes suppuration, but no permanent effect. In the second series, Rake has noticed, in some cases, a certain amount of local ulceration and destruction of tubercles, but not to any marked extent. The ulcers soon healed, leaving the tubercles nearly as large as before. In the third series, Rake thought that the receptivity of the patient might be increased by the leprotic fever, and that possibly the leprosy bacilli, being more active at that time, might be more amenable to the influence of antagonistic cultures. The same local effects were, however, also observed in these cases.

The Treatment of Leprosy by Koch's Tuberculin.—A large number of experiments have been tried during the past year in the treatment of leprosy by Koch's "tuberculin," but the results have, for the most part, been negative. I have selected a few reports to place the matter on record. It will probably prove no more than a milestone to mark the gradual advance of medical science in the knowledge and treatment of this affection.

Doutrelepoint⁶⁹_{Apr. 16} reports the case of a patient to whom twenty-eight injections of tuberculin were administered between December 2, 1890, and January 28, 1891. The first injection was $\frac{1}{2}$ milligramme ($1\frac{1}{2}$ grain), the last 0.15 grammme ($2\frac{1}{2}$ grains). Not until the sixth injection (of 0.004 grammme— $\frac{1}{16}$ grain) was there any reaction. Then the temperature rose slightly, erythema appeared on both forearms, and this outbreak was repeated with the increasing dose and higher temperature, the eruption fading the next morning. After the eighth injection (of 0.007 grammme— $\frac{1}{8}$ grain) the temperature rose to 38.8° C. (101.8° F.). After the tenth injection (0.009 grammme— $\frac{1}{4}$ grain), the temperature rose to 39.1° C. (102.4° F.). The same temperature was reached after the eleventh injection (10 milligrammes—0.010 grammme— $\frac{2}{3}$ grain). Following the thirteenth and fourteenth injections (12 and 15 milligrammes— $\frac{3}{8}$ to $\frac{15}{8}$ grain), the evening temperature was 39° C. (102.2° F.), and from this time on, in spite of the increasing dosage, the temperature fell gradually to normal. The erythematous eruption continued to show itself in a diffuse or macular

form on the arms, and once on the leg. No improvement in the leprosy was noted.

A second case was treated similarly, with the result as before, excepting the eruption of leprosy came out, to a considerable extent, just during the course of treatment. The patient's sputa was examined, as well as the tubercles, and very numerous leprous bacilli were found, so that the slide, when colored with carbolfuchsin, showed the agglomerations to the naked eye. These were, in some cases, found to be inclosed in cells, as in the tissues, and this, together with their great comparative number, and the fact that they readily colored in watery solution of fuchsin, distinguished them from tubercle bacilli. During the appearance of new tubercles, numerous lepra bacilli were found in the blood taken from the tip of the finger, although no tubercles could be seen on the hand. The bacilli were found in many white blood-corpuscles about the nucleus, or, in some cases, free in the serum. No bacilli were found in the blood in the first case.

The experiments of Arning,¹⁰ Babes and Kalindéro,¹¹ and Goldschmidt,^{12, 13} show about the same results. Arning practiced the injection of tuberculin on 2 cases of macular leprosy without producing any reaction, general or local. In a case of tubercular leprosy there was general but no local reaction. Babes and Kalindéro noticed a general reaction, differing, however, from that observed in tuberculosis. They do not think, with Arning, that this may be due to latent tuberculosis, which, Arning says, is so common in leprosy. Their seven patients were under no suspicion of tuberculosis. They say that in tuberculosis the general reaction, after the injection of tuberculin, begins about six hours after inoculation; in leprosy it generally comes on twenty-four, or, less frequently, in twelve hours after inoculation; in 1 case, however, of anæsthetic leprosy, with pemphigoid eruption, reaction set in two hours after injection. The duration of the fever varies in leprosy, as do the symptoms, just as they do in tuberculosis; after inoculation they usually last longer. After the first reaction a second one shows itself on the following day, and often another on the third day after inoculation. In tuberculosis these repetitions are exceptional. Contrary to what is seen in tuberculosis, a cumulative action is observed in leprosy if the injections are repeated daily. [But this does not appear from Doutreleont's

observations, which I have noted at length on page 35.—A.V. H.] The local reaction of tubercle is not usually seen in leprosy ; when observed, the tubercles, instead of eliminating their products, as in tuberculosis, show only congestion, with subsequent scaling off. Babes and Kalindéro note improvement in symptoms. One case of aphonia recovered his voice. In 1 case of nerve-leprosy, hyperæsthesia took the place of anaesthesia after inoculation, and later general improvement was observed in the patient's general condition and intellectual faculties, together with increase in the motor power and sensibility of the affected limbs. Babes and Kalindéro conclude that, although leprosy is allied to tuberculosis, the two diseases are altogether distinct, and that Koch's fluid serves to decide (a) whether, in a given case, the affection is tuberculous or leprous; (b) whether leprosy is, at some particular time, associated with tuberculosis ; and (c) whether a suspicious trophoneurosis is leprotic or not.

Goldschmidt, of Madeira, used tuberculin in 5 cases of leprosy, 4 of which were of the tubercular and 1 of the anaesthetic paralytic type. The liquid, if placed in immediate contact with the diseased parts, seemed to cause powerful irritation. He thinks tuberculin causes both general and local reaction in leprosy,—a fact which, he says, must detract from its value as an aid to diagnosis in tubercle.

I have thus given a selection from the numerous papers which have appeared on this important and interesting study of the effect of tuberculin on leprosy. The sensational manner in which this remedy has been introduced into medical practice, and the indiscriminate way in which it has been employed, not infrequently with fatal results, has been a great reproach to medical science. In a disease so desperate as leprosy its use has been justifiable ; not so in lupus.—A. V. H.

Gurjun- and Chaulmoogra- Oils in Leprosy.—Phillippo, of Jamaica,¹⁸⁸ says that, in a dozen or more cases, gurjun-oil did good, ulcers being almost invariably and rapidly cured by its application. In 1 case the oil, prepared with lime-water, was rubbed into the general surface twice a day, after bathing. The oil was also applied as an ointment to all swellings and ulcers, and, when renewing it, cashew-nut-oil was first applied and allowed to dry in. A tablespoonful of the gurjun-oil, prepared with a smaller quantity

of lime-water, was taken internally morning and evening. For an hour or two after rubbing in the oil the feeling was uncomfortable, and there was a pricking, warm sensation all over the body. A long-continued course of this treatment did some good, but not much. About a year later chaulmoogra-oil was substituted for internal use, while the gurjun-oil was continued externally. The patient then began to improve slowly. This treatment was continued until January, 1886, when the patient was cured, and has had no return of the disease since. Phillippe Berge¹² has used chaulmoogra-oil in 4 cases of leprosy with excellent results. He considers it a most powerful alterative, and perhaps the only reliable remedy for leprosy. Its absorptive properties are incontestable, and are sufficiently proven by the rapid decrease in the size of the tubercles, etc.

LUPUS.

Dubois-Havenith,²⁸⁸ in a *thèse d'agrégation* of the highest merit, poses the questions: 1. Is lupus tuberculous in character? 2. Can lupus give rise to visceral tuberculosis? 3. Pulmonary tuberculosis being frequent in lupous patients, is it more frequent with those who have submitted to bloody operations? He regards lupus vulgaris as one of the forms of integumentary tuberculosis. The proofs of this are derived (1) from histology—the primary lesion of lupus offering the characteristics of pulmonary tubercle; (2) from microbiology—the presence of Koch's bacillus having been demonstrated; (3) from experiment—inoculations of lupus upon animals giving positive results; (4) from clinical observation: (a) lupus develops frequently in the neighborhood of articular, ganglionic, or osseous lesions of a tubercular character; (b) lupus may result from direct inoculations of the tuberculous virus; (c) pulmonary tuberculosis is a frequent cause of death in lupous patients; (d) other tuberculous manifestations frequently co-exist with lupus; (e) the investigation of the family history of lupous patients frequently shows tuberculosis in relatives; (f) lupus may give rise to secondary visceral infection.

Dubois-Havenith then proceeds to demonstrate the bacillary origin of lupus, and goes on to examine from whence the pathogenetic bacillus comes. To prove the extrinsic origin of the latter he develops the following considerations, based upon personal observation: 1. Lupus generally begins in some exposed part of

the body, chiefly the face. 2. An occasional cause of lupus is a wound, a fall, an eczema, erysipelas, etc. 3. Many facts go to show that lupus may, in some cases, be the result of direct inoculation of the tuberculous virus; *e.g.*, in one case lupus was found to have developed in a tattoo-mark, where the operator, who was a phthisical patient, had employed his saliva to moisten the tattooing-needle.

If lupus is really of extrinsic origin, it is a local tuberculosis. May it give rise to visceral tuberculization? Dermatological statistics are contradictory on this point. One author gives cases going to show that authentic cases of auto-infection caused by lupus exist, and he also quotes Leloir's histological and experimental proof that certain ganglionic adenopathies, secondary to lupus, are of a tuberculous character. Since lupus is tuberculous in character, scraping and scarification should be regarded, to a certain extent, as presenting the conditions of experimental inoculation. *A priori* such operations are dangerous, and should, therefore, be followed by cauterization with the thermo-cautery, nitrate of silver, or chloride of zinc. As to the operation advisable in any given case, if the lupous patient is free from the suspicion of any other tuberculous manifestation, the immediate and total extirpation of the lupous patch offers the best chance for preventing a generalization of the affection. If ganglionic engorgements exist, these too should be removed. If, on the other hand, general tuberculous manifestations exist, no general rule for operation can be given. In this case the cutaneous lesion becomes a secondary matter, and the physician's attention should be directed to the deeper symptoms.

Dubois-Havenith, in the light of his personal experience, examines each of the operative procedures commonly employed, and shows that we must consider all the attending circumstances in making a choice in any given case. The danger of auto-inoculation, of relapse; the mean duration of treatment; the extent of the lupus in depth and area, its form and variety; the circumstances of the patient, and his accessibility to the physician, all must be considered.

In a clinical lecture on this subject, Leloir ⁴⁷⁹ _{o.s.s. 19} states that he regrets that no monograph on this subject has as yet appeared from the pen of a dermatologist of authority who is convinced of the tuberculous character of this disease, and he again raises the

question of the insufficient definition of the term "tubercle." Leloir defines lupus thus: Lupus is one of the forms of cutaneous tuberculosis of a mild character, of which the elementary lesion is a tubercle of various size and of a reddish-brown color, of soft consistence and slow evolution, destroying the tissues, either by interstitial resorption or by sclerosis. Lupus may invade any part of the skin, or of the adjacent mucous membrane. It is often accompanied by other scrofulo-tuberculous lesions; like all cutaneous tuberculosis, it may produce partial or general infection of the system. It usually begins in infancy or adolescence. This lesion, which Leloir calls "lupoma," usually shows itself in the derma in the form of nodosities, taking on the aspect of the elementary tubercle, or occasionally assuming a diffuse aspect. Leloir, therefore, divides lupus into two varieties,—lupus diffusum and lupus nodosum. On examining a patch of lupus attentively, however, it will always be found to be made up of tubercles which have conglomerated, and, should softening and ulceration take place, this will occur not as in syphilis, throughout the whole area of the lesion, but at numerous points corresponding to these tubercular centres. Lupus, therefore, has for its elementary lesion a tubercle (or occasionally a tubercular gumma). We call this lesion a lupoma. For this reason, like all elementary tubercular lesions (parasitic nodosities), it pursues an extended course, excentric, invading, destructive, and is followed by more or less marked cicatrices. Lupus is, in its elementary lesion, a tubercle; therefore it is produced by a definite pathogenic micro-organism, the bacillus tuberculosis; and therefore, also, it is a local tuberculosis. This local tuberculosis is not very virulent, so that lupus follows a slow, chronic course; but it is sufficiently virulent to cause complications of an infectious nature,—either by contiguous infection (lymphangitis, scrofulo-tuberculous gummata, or adenopathies) or by general infection (pulmonary tuberculosis, acute miliary tuberculosis, etc.). The diagnosis of lupus is sometimes difficult. We must search for bacilli, which are sometimes few and far between and hard to find, or we must experiment with inoculations upon animals with all possible precautions. It is thus only that we can with certainty distinguish lupus from certain syphilodermata. Lupus, therefore, being a local tuberculosis, we must treat it as such. We must destroy it by antiparasitic agents.

Leloir gives the following interesting classification of the different varieties of lupus :—

LUPUS OF THE EXTERNAL INTEGUMENT.

A. PERIOD OF AUGMENTATION.	$\left\{ \begin{array}{l} Lupus planus \\ Lupus elevatus \end{array} \right\} \text{ and their varieties } \left\{ \begin{array}{l} Lupus non-exedens \\ Interstitial resorption \\ Fibrous degeneration (Lupus sclerosus). \end{array} \right.$
B. PERIOD OF REGRESSION OR DEGENERATION.	$\left\{ \begin{array}{l} \text{Ulceration.} \\ \quad \left\{ \begin{array}{l} \text{Superficial ulceration} \\ \text{Deep ulceration} \\ \text{Lupus vorax} \\ \text{Lupus phagedenicus} \end{array} \right\} \text{ and their varieties } \left\{ \begin{array}{l} Lupus exedens \\ \dots \end{array} \right. \end{array} \right.$

In connection with this scheme, Leloir describes the objective differences which are presented by lupus, according to its course, the number and disposition of its elements, its seat, its rare atypical varieties, its complications, etc. The whole lecture, with its lucid and full description of lupus, forms one of the best clinical expositions of lupus, from a modern stand-point, which we possess.

Lupus of the Mouth, Pharynx, and Larynx.—Barling⁶ says that these lesions are commoner in connection with skin-lupus than is suspected. The earliest condition appears to consist in a light-red area, well defined on its edges, with tiny white spots seated upon it, and with a loss of surface which is too superficial to be described as an ulceration; later, these white spots disappear and a surface, sometimes granular, at others quite papillary or mammillated, is presented, superficial ulceration being seen side by side with this. The ulceration may extend until it involves almost the whole thickness of the mucous membrane,—for instance, of the palate,—but it does not appear to perforate or destroy bone; though, like lupus of the skin, it does not respect cartilage, for the epiglottis may suffer severely. Cicatrization sometimes occurs spontaneously, and, if it does not, the progress of the disease is very slow, and is very much influenced by such local treatment as the use of lactic acid and by general tonics. Barling appears to think the curative value of tuberculin considerable in lupus of the mucous membranes.

Schwimmer²² tried tuberculin on 31 cases of lupus during ten weeks' treatment. Eight of these were probably not true lupus. Four cases of true lupus improved slightly, but all the others remained unchanged or became worse. (See also "Cutaneous Tuberculosis.")

CUTANEOUS TUBERCULOSIS.

Clinical Aspects.—In a paper read, at the request of the American Dermatological Association,⁹⁹ before that body at its

latest meeting, James C. White, of Harvard University, treats of the clinical aspects and etiological relations of this group of disorders. After having alluded to the lamentable display of ignorance on the part of ambitious practitioners who yielded to the craze for the trial of Koch's treatment, and made rash experiments with this powerful remedy without even knowing the clinical features of the disease they were attempting to treat, White optimistically remarks that if this craze shall result in no more immediate good than the creation of a proper interest in the study of the manifold manifestations of cutaneous tuberculosis it will not have vexed the world in vain.

White then goes on to briefly sketch the clinical aspects of various skin diseases formerly regarded as independent of one another, but which, in the present state of our knowledge, are to be regarded as progressive phases or clinical forms of a single affection. The first of these is *lupus vulgaris*, the various forms of which White describes briefly, according to the most recent clinical researches. It appears that even those lesions which are by common consent classed as *lupus* are subject to great variations in appearance, but a careful analysis simplifies their essential characteristics greatly.

Another form of tuberculosis cutis is that ordinarily known as *verruca necrogenica* or anatomical tubercle. This used to be regarded as an ordinary wart, and is so classed in many textbooks; but since 1884 the tuberculous character of this affection has been admitted. *Tuberculosis cutis* was the name given, before its true and comprehensive significance was understood, to certain ulcers observed by Chiari, Jarisch, Kaposi, and others, about the lips, anus, and vulva in certain patients in the advanced stages of consumption. There is no apparent reason for regarding these classic cases as otherwise than exceptional forms of auto-inoculation assuming a rapidly ulcerative state, from the generally depraved condition of the patient's tissues.

Scrofuloderma is the term now most commonly applied to the progressive changes which take place in the skin covering the so-called scrofulous glands of the neck.

Tuberculous dactylitis is a similar condition, occurring in the toes and especially in the fingers of scrofulous children, and characterized by bowl-shaped enlargement and chronic inflammation

of the overlying integument, and terminating, very often, in destructive ulceration of the same. This affection is much more common than the syphilitic disease which it closely resembles, and for which it is often taken and treated accordingly.

A peculiar *suppurative tuberculous lymphangitis* has been described by Hallopeau; a rare affection, characterized by swelling, from filbert to egg size, along the course of the lymphatics.

The so-called *lichen scrofulosorum* and some other dermatoses regarded by authors as tuberculous because occurring in scrofulous persons have nothing specific about them. White's paper is, unfortunately, too long to be reproduced here, even in abstract; but, as a summing up and general view of the present state of our knowledge, it is of the highest value.

Debove,⁴⁷⁹ _{Nov., Dec., '90} in a clinical lecture on cutaneous tuberculosis, says that, ordinarily, the lesions are ulcerative. They usually occur about the natural orifices in phthisical patients. Occasionally they precede the pulmonary symptoms, and may serve as the point of infection to the general system. In addition to these characteristic ulcerations, the ordinary lesions known as *lupus vulgaris* are to be accounted as tuberculous, and also anatomical tubercle.

Riehl and Paltauf have directed attention to a lesion which they call "tuberculosis verrucosum," and there is now, also, recognized a lesion called "tuberculous gummata." While the pus from these gummata has not, until recently, shown the bacillus tuberculosis, inoculations upon the rabbit have resulted in tuberculous lesions. Debove has, indeed, recently found Koch's bacillus in pus derived from a gumma. Debove has also shown that an incision made into one of the subcutaneous gummata results in an infection of the skin and in a cutaneous lesion, and he cites a case of Prioleau's where lupus followed an incision of this sort. In the case presented at this lecture, Debove showed that the tuberculosis was not virulent. Few bacilli were found in the skin-lesions, the lungs changed but little, and the patient retained his weight and health for some months unchanged. Debove gave a favorable prognosis.

Pathology.—John T. Bowen,⁹⁹ _{Nov. 12} in a paper read before the American Dermatological Association, introductory to the important discussion of that subject which took place, said that no one doubts to-day that the greater part of the troubles formerly called scrofu-

lous are, in reality, tuberculous troubles. Koch, Doutrelepont, and others have shown that the bacillus of lupus, though sparingly represented, can be demonstrated in lupous tissue, and can be cultivated in generations and made to produce tuberculosis by inoculations upon animals. As yet, however, lupus has not been produced by direct inoculation. Bowen then goes on to describe the tubercle, the product of the tubercle bacillus, and the experiments which have been made in its propagation. Turning to the special features presented by cutaneous tuberculosis, Bower describes miliary tuberculosis of the skin, scrofuloderma, lupus, and tuberculosis verrucosa cutis, in their microscopic characteristics, his paper forming an admirable accompaniment to the clinical descriptions of White, to which we have already alluded under the same head.

Treatment.—G. H. Fox,⁹⁹ in a paper read before the American Dermatological Association, one of a series on cutaneous tuberculosis (*q. v.*), says that excision by the knife is objectionable to the patient and in no way superior to the other forms of treatment. He also condemns the cautery in all forms, as it acts equally on healthy and diseased tissue, and must either produce an unnecessarily deep ulcer, or else the smooth, superficial, delusive cicatrix will soon appear, studded with isolated nodules. Whether a Paquelin or a galvano-cautery be used, the operation is painful and the result either uncertain or disfiguring.

Fox thinks Besnier's treatment of lupus by heat the best, but has no experience with it. I may say I consider it decidedly the best. The method consists in making punctate and linear scarifications by means of variously shaped needles, knives, and buttons of platinum, connected with a galvano-caustic battery. Fox, being skeptical as to the danger of general tuberculous infection resulting from blood-letting operations, has failed to appreciate the advantages claimed by Besnier for his method of treatment. I, however, agree with Besnier in all respects, and have gotten the best results from his method of treatment. The use of the flat electrode for the destruction of lupous tissue, as indorsed by G. T. Jackson at the last meeting of our association, Fox has tried repeatedly. He, however, thinks the operation so tedious as to be impracticable. Fox considers the curette and also the dental burr²⁰⁵⁷ and Morris's double screw as very useful means for the cure of lupus. He thinks

that too much has been said in favor of linear scarification, but also thinks that the assertion that it favors the absorption of bacilli is without clinical foundation. For my own part, I think scarification the best method for the treatment of lupus yet devised. Fox admits that it will cure lupus in most cases and leave the most satisfactory cicatrix. The only objection which he has to it is that it involves more time and patience than patients will ordinarily give.

As regards the caustics usually employed in the treatment of lupus, chloride of zinc, nitrate of silver, caustic potash, lactic acid, ethylate of sodium, iodoform, and aristol, Fox thinks these possess no especial value in the treatment of lupus, in which (excepting caustic potash) I agree with him. The use of bichloride of mercury, on account of its bacillicide properties, has been recommended by White, of Harvard, and others. Fox has found this method of treatment unsatisfactory. As a dressing for ulcerative lupus and for lupus after curetting (evidently Fox's favorite treatment), pyrogallol (pyrogallic acid) in 10-per-cent. ointment, applied twice daily, seems to be most satisfactory. After three to five days, iodoform is applied and boric-acid ointment, which allays the irritation and cures any inflammation which may have been produced. After this, mercurial plaster is applied, and after four or five weeks the same series is gone over. Finally the wound is healed over by skin transplantation.

Fox says that for many years he has had the most satisfactory results from the above or a similar plan of treatment. He uses a 25- to 50-per-cent. ointment of pyrogallol. The first effect may be painful and inflammatory, but it soon becomes numbing. When a simple ointment is applied and the dead tissue sloughs, more pain may be felt. Later, a clean, raw surface results, which is treated with mercurial plaster, and a smooth cicatrix is the termination. Fox has no hesitation in recommending the use of the curette, followed by the strong pyrogallol ointment and the mercurial plaster, as the best treatment not only of lupus, but also of rodent ulcer. He mentions salicylic acid as used by Unna. The latter employs this remedy in connection with creasote, which he calls the "morphine of the skin." The properties of these remedies are, unfortunately, not mentioned by Fox, although he says he has used a similar combination with satisfaction.

Fuchsin is a new remedy employed by Fox with good result.

A 1-per-cent. alcoholic solution painted on the recently scarified surface of a lupous patch seemed to be of great value and quite painless. The constitutional treatment of cutaneous tuberculosis is, according to Fox, specific and non-specific; the former aiming at a direct action in the morbid growth, the latter merely improving the general condition of the patient, and thereby modifying the soil upon which the tuberculosis is planted. Fox thinks there is such a thing as scrofula. It is an inherited or acquired condition of certain tissues which leads to the development of definite and characteristic symptoms. It doubtless renders the subject of this diathesis especially liable to the engrafting of tuberculosis in the strict sense of the term. Codliver-oil, iodine, and the hypophosphites combat this condition, and so does iodide of starch. As regards Koch's treatment, Fox is doubtful, inclining, however, to believe it useless.

MISCELLANEOUS.

Dermatomyositis Acuta.—Unverricht¹⁴ describes a curious case of sudden general soreness and sensitiveness of the entire external muscular system, accompanied by œdema, redness and tenderness, and itching of the skin. He thinks the disease due to an invasion of gregarines, as described by Virchow, in animals.²⁰ There did not seem to be any general disturbance of the system, although the attack had been ushered in by headache, feverishness, and sick stomach. The affection may be mistaken for trichinosis.

Emphysema of the Subcutaneous Tissue.—Felsenthal¹⁵⁸ gives the case of a child, 2½ years of age, who had suffered from measles for six weeks, with much coughing. Suddenly, in the night, numerous swellings appeared under the skin. On examination the next day, semi-globular swellings were observed on both cheeks, on the eyelids, the skin over the whole thorax, extending down to the sacral region posteriorly. These tumefactions felt as if filled with air, and crepitation could be observed around their borders. On percussion they yielded a tympanitic resonance. There was a general rattling sound on auscultation over the thorax generally. The cause of these appearances Felsenthal explains as excessive increase of pressure within the alveolar tissue, produced by severe paroxysms of coughing. Following this, rupture of the individual alveoli of the lung occurred, air passed into the surrounding tissues, and interstitial emphysema resulted. The air-

bubbles then pressed under the pleura to the lung-hilus, from there, by way of the trachea, to the jugular region, and thence spread to the subcutaneous connective tissue. He refers to Henoch, ²⁰⁵ _{Dec. 18, '90} Baginsky, ²²⁸ _{Aug. 1} and Damsch ⁶⁹ _{Nov. 12} for similar cases.

Eczema.—Under the title "What is Eczema?" H. Leslie Roberts ¹⁸⁷ _{July} gives a full and careful discussion of the origin and nature of this disease, which is suggestive and worth reading.

Ichthyosis, Intra-uterine.—Geo. T. Elliot ²⁴⁵ _{July} publishes 2 cases of this curious affection, with a bibliography of previously recorded cases. The paper is worth careful perusal.

Influenza Exanthemata.—I am sorry that more communications on the eruptions accompanying and following influenza have not appeared in the medical journals or, at least, have not been brought to my notice. The opportunity of studying these curious accompaniments of influenza is one which should not be lost. Munro ²⁴⁵ _{July} gives the case of a haemorrhagic exanthem following influenza, accompanied by a chromo-lithograph. The case was one of purpura with large lesions.

Lymphangioma Circumscriptum (Lymphangioma Capillar, Varicosum).—Noyes and Török ⁸⁹⁷ _{Dec. 20, '90} give a general review of this subject, with personal observations and microscopic examinations. The disease or group of affections is one of great interest, but of such rarity that few observations are on record. These are collated, as far as possible, by our authors, with critical remarks.

Morphea and Scleroderma.—Jonathan Hutchinson ⁸⁰⁶ _{July} collects a number of cases of these diseases, and points out their connection with hemiatrophy facialis. The articles are illustrated with cuts giving the clinical features of some of the cases.

Melanosis Cutis.—Hutchinson ⁸⁰⁸ _{July} makes some remarks on this disease of the skin, in connection with its extension along the lymphatics, and gives a colored picture of a case. As in many of these articles, the cases are not thoroughly described, and the pictures are unsatisfactory. Lagrange ⁶ _{Apr. 4} has made some investigations regarding the distribution of pigment in melanotic tumors.

Dubreuilh ¹⁶⁵ _{Dec. 15, '90} gives a full clinical account of a case of localized melanoderma.

Mycosis Fungoides.—Several papers have appeared on this subject during the past year, of which the following have come to my notice: Hallopeau, ²⁸⁷ _{July} Brocq and Matton, ²⁸⁷ _{July} Emerich Busch, ⁸⁴ _{Aug. 11}

with general discussion and exhibition of microscopic specimens, and Reboul¹⁷⁹ a case successfully treated by dressings and interstitial injections of camphorated naphthol.

Madura Foot.—Köbner⁴⁶ recently demonstrated to the Berlin Dermatological Society a preparation of the fungus of madura foot (*mycetoma pedis*), from a case occurring in Italy, under the care of Bassini, of Padua; the first recorded outside of India.

MISCELLANEOUS THERAPEUTICS.

Urticaria.—Quinquaud⁸⁷ says that, in the intermittent forms, sulphate of quinia, in doses of 5 to 10 grains (0.33 to 0.66 gramme), may act, but it is often insufficient alone, and Fowler's solution must be added in daily doses of 20 minims to 15 minims (1.3 grammes to 0.97 gramme) if tolerated. In the chronic forms, alkalies, arsenic, and naphthol ought to be given internally. Hydrotherapy is usually bad. Alibert observed that patients were better if kept in bed and wrapped in wool. To ease the pruritus, the following lotions may be used:—

R Chloral hydratis, 3ij (11.66 grammes).
Aquaæ laurocerasi, f3ij (45.00 grammes).
Aqum, ad Oj ($\frac{1}{2}$ litre).—M.

Another is:—

R Tinct. camphoræ, 3j (80.00 grammes).
Aquaæ chloroformi, ad f3x (297.00 grammes).—M.

To cope with actual outbreaks, $\frac{1}{20}$ grain (0.00054 gramme) of aconitia may be employed.

Verruca Acuminata (Condyloma).—Tchernomordik⁸⁷ uses the following:—

R Plumbi oxidati, gr. iv (0.26 gramme).
Sol. potas. caust. (33 per cent.), . . . f3ij (7.50 grammes).—M.
Sig.: Shake well before using.

The parts should be first cleansed thoroughly by means of a brush moistened with some antiseptic lotion, and then thoroughly dried, after which the warts, each separately, are painted (by means of a cotton-wool swab) with the lead solution, care being taken to avoid any superfluous cauterization of sound cutaneous areas. In about five minutes the new growths blacken and become formless mucoid masses, which can easily be removed by means of pieces

of dry cotton-wool. As a rule, a single application is enough. Sometimes this procedure has to be repeated twice or thrice, at intervals of two or three days. The raw surface should be powdered with iodoform, and heals in three to ten days.

Eczema.—In the nervous eczema of children, Ravogli uses the following lotion:—

R Ammon. sulph. ichthylolatis, 3ij (7.78 grammes).
Glycerinæ, 55 f3ss (15.00 grammes).—M.
Aqua rosæ, 55 f3ss (15.00 grammes).—M.

Veiel⁸⁴ says that eczema is not always curable. There are certain families in which the disease is hereditary and very stubborn; eczema occurring in the neighborhood of scars is likewise very hard to heal.

Erysipelas.—Ulrich⁸⁷³ has made a careful comparative examination of the effects of ice, tar, and ichthylol, liberally applied, with the result of proving the marked superiority of the latter. The formula employed was:—

R Ammonia sulph-ichthylolatis,
Ætheris, 55 f3ij (6.75 grammes).
Colod., 55 f3ss (15.00 grammes).—M.

This was painted over the affected parts often enough to keep a constant coating.

Pruritus.—Dürr⁴⁷⁹ recommends 3 to 5 parts of creolin in 100 parts of linseed-oil, applied three or four times a day.

Comedo.—To remove the dark color from comedones, Unna prescribes the following:—

R Sol. hydrargyri peroxid., partes xx-xl.
Vaselinæ, partes xx.
Lanolini, partes x.—M.

If the comedones are complicated with pustules and papules, he recommends an ointment of sulphur or sublimate for the removal of the latter.

Syphilitic Ulcers.—The following lotion is recommended by Plumert.⁸⁹⁷ He applies the following by means of compresses in syphilitic ulceration: Salicylate of mercury, 1 part; carbonate of potassium, 1 part; distilled water, 100 parts. The following ointment may also be employed: Sylicylate of mercury, 1 part; vaselin, 30 parts.

Alopecia.—Lassar and Groetzer⁶⁷ give the following directions: 1. Thoroughly wash the scalp for ten minutes with tar soap. 2. Wash with hot water and finish with cold; wipe and dry. 3. Rub in a solution of bichloride of mercury, 1 to 900 (equal parts of water, glycerin, and eau de cologne). 4. Rub in a solution of naphthol as follows: Naphthol, 1 part; absolute alcohol, 200 parts. 5. Anoint the scalp with a pomade containing acid salicylic, 2 parts; tincture of benzoin, 10 parts; neat's foot oil, 100 parts.

This treatment should be carried out daily and continued for six weeks or more.

Acne.—Brocq⁶⁷ washes twice daily with hot water, employing friction, according to the sensitiveness of the affected part, and applies the following lotion:—

R Hydrarg. bichlor.,	1 part.
Spts. rectif. (90 per cent.),	50-100 parts.
Aq. destil.,	100-150 parts.

At first, this should be diluted with an equal part of hot water, but should be gradually strengthened. Another lotion, called the "Oriental lotion," is composed of:—

R Hydrarg. bichlor.,	gr. xxv (1.62 grammes).
Aqua destil.,	Oj ($\frac{1}{2}$ litre).
Albumen ovi,	ij
Succus limonis,	ss
Sacch. alb.,	3iv (15 grammes).—M.

Brocq uses the following:—

R Hydrarg. bichlor.,	gr. j (0.065 gramme).
Ammon. chloridi,	gr. ii-v (0.13-0.32 gramme).
Alcoholis,	gr. c (5.63 grammes).
Aqua destillat.,	ad Mcl.—M.

Another combination employed by Brocq is the following:—

R Naphthol- β ,	3j (3.90 grammes).
Sulphuris præcipitat.,	3v (19.44 grammes).
Pulv. zinci oxidii,	3ij (7.78 grammes).
Lanolinæ,	3v (19.44 grammes).
Ol. amygdalæ dulcis,	3vij (27.22 grammes).
Ext. violets,	q. s.—M.

Hyperidrosis.—Szadek, of Kieff,⁵⁹ returns to this well-worn subject, and gives some personal experiences. One of his preparations contains a drachm (3.89 grammes) of sublimed sulphur, with 8 grains (0.52 gramme) of salicylic acid and an ounce (31 grammes)

of powdered arrowroot,—a mixture worth trying, in some cases of hyperidrosis.

Tuberculous Ulcers.—Thiele⁶⁹⁷ has obtained excellent results from treating tubercular ulcers by a frequent and thorough application of gauze soaked in balsam of Peru. Under the influence of this antiseptic agent, the discharge rapidly assumes a better appearance, and becomes even less abundant, bleeding granulations disappear, and the ulcer quickly heals, while the patient's general state markedly improves.

Europhen.—Eichhoff³⁵⁷ _{Aug. 15} says that this new remedy seems to be non-poisonous. It is light, and, in the form of powder, goes further than iodoform. Ointments and solutions of europhen have to be made in the cold. Eichhoff has used europhen in powder and in 2- to 10-per-cent. ointments in syphilitic ulcers, in scrofuloderma, lupus, and erythema caloricum.

Physiological Treatment of Skin Diseases.—Dujardin-Beaumetz,³ _{Oct. 14} on the part of Semmola, of Naples, presents a paper asserting that eczema and psoriasis are determined in winter by the irritant action of the products eliminated from the skin. He proposes to establish an equilibrium between the activity of the organic changes and the depurative functions of the skin. He submits his patients to daily baths of two or three hours, at 30° to 35° C. (86° to 95° F.), beginning in September. After four weeks of this treatment, he gives Scotch douches, which are continued through the winter. By way of medication, he uses large doses of iodide of sodium for the scrofulous, and bicarbonate and phosphate of sodium in rheumatic and gouty cases.

Herpes Zoster Following the Use of Arsenic.—Epstein³⁴ _{July} reports 2 cases of herpes zoster occurring during the use of arsenic, and remarks that the pigmentation of the skin sometimes also observed is caused by hyperæmia, which, he thinks, also accounts for the œdema sometimes met with.

Depilatory Paste.—The following depilatory paste, although the formula is as old as the hills, may be mentioned here, because of the renewed interest in such remedies when disappointment has followed the attempt at a radical cure of hypertrichosis. It is recommended by Dr. Van Allen⁵⁹ _{Sept. 10} :—

R. Pulv. calcis vivæ (air-slaked), 3j (8.89 grammes).

Arsenici trisulphuret (orpiment), gr. ij (0.18 gramme).

M. Sig.: Add water enough to form a paste, and mix.

Apply to the hairy surface about a quarter of an inch thick. Allow the paste to remain for fifteen or twenty minutes, when it will be dry. Remove, and the surface, which before was hairy, will be as smooth as the palm of one's hand, the hair coming off with the paste. The skin may or may not be reddened, but this redness will pass away within an hour or so. After a few days the eaten-off ends of the hairs will be seen on careful examination, but a second application of the paste will, as before, destroy the hair. These applications will have to be made about twice a week at first, then once a month, etc. The hair grows out at first very much as if it had been merely shaved off; later, on careful examination, each individual hair is found to be thinner than before, growing less strongly, the hair, if black, losing its color, and, in a word, yielding to the continual irritation of the paste. This treatment requires about a year or a year and a half to effect an entire cure, but it possesses the advantage that, immediately after the first application, the patient is, as far as all outward looks go, completely relieved of her deformity.

Ichthyol Varnishes.—To produce an impermeable layer of ichthyol, which can be easily and quickly removed without irritating the skin, Unna⁶⁹⁷ uses the following: Ichthyol, 40 parts (by weight); starch, 40 parts; concentrated solution of albumen, 1 to $1\frac{1}{2}$ parts; water, enough to make 100 parts. The constituents must be mixed in definite order: the starch must be moistened with the water, the ichthyol then rubbed well in, and, finally, the albumen must be added. The concentration may be regulated by the thickness of the layer, the first application being wiped off with a moist cloth, so as to have the finest possible coating. Even a thick layer dries very rapidly and can be washed off at any moment. An ichthyol-carbolic-acid varnish having the same properties can be made in a similar way, but, of course, with the omission of the albumen. The formula is: Ichthyol, 25 parts; carbolic acid, 2.5 parts; starch, 50 parts; water, 22.5 parts. The ichthyol and carbolic acid are dissolved in the water with gentle heat, and the starch then added. The first preparation, "*vernis sum ichthyoli*," is recommended in *acne* when the skin is irritable, in *rosacea seborrhæica* and in *rosacea simplex*, in "*ulerythema centrifugum*" (one form of *lupus erythematosus*), in *intertrigo*, "*tubercular*" *eczema*, seborrhæic *eczema*, and *erysipelas*.

OPHTHALMOLOGY.

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SECTION I.

CONGENITAL ANOMALIES, EMBRYOLOGY, AND HISTOLOGICAL ANATOMY.

FROM a study of the formation of *cyclopic monsters*, Darest ¹⁷¹ _{Sept.} concludes that the production of a single eye, the changes in the structure of the mouth, the atrophy and abnormal situation of the olfactory apparatus, and the arrest of development of the vesicle of the hemispheres, all result from an arrest of development of the anterior cerebral vesicle. This, he says, may come from a simple arrest of development, or from compression exercised by the amnion, which has itself been arrested in development. The latter causation is perhaps the more frequent. The author believes that the determining influence must be exerted very early in the life history of the embryo. Lapersonne ²⁷⁴ _{May, June} has contributed a careful study of a case of double *microphthalmos with orbital cysts*. Most interesting was the disposition of the cystic wall, which was found to be formed by retinal tissue so distorted as to present its external layers to the cavity of the cyst. The author assumes that it is most natural to suppose that the retina had become secondarily detached and had formed numerous convolutions, filling the ocular cavity; that one of these folds, facing the ocular opening, had been pushed forward, perhaps by a liquid analogous to that of certain retinal cysts, and, yielding to this pressure, had been invaginated like a glove-finger, and forced outward into the cellular tissue of the orbit, where it had received a fibrous envelope from this tissue. The theories of Manz, Arlt, and Lang, the author observes, are not applicable to the conditions found in his case. He finally suggests a rational classification of cases of microphthalmos, based upon the

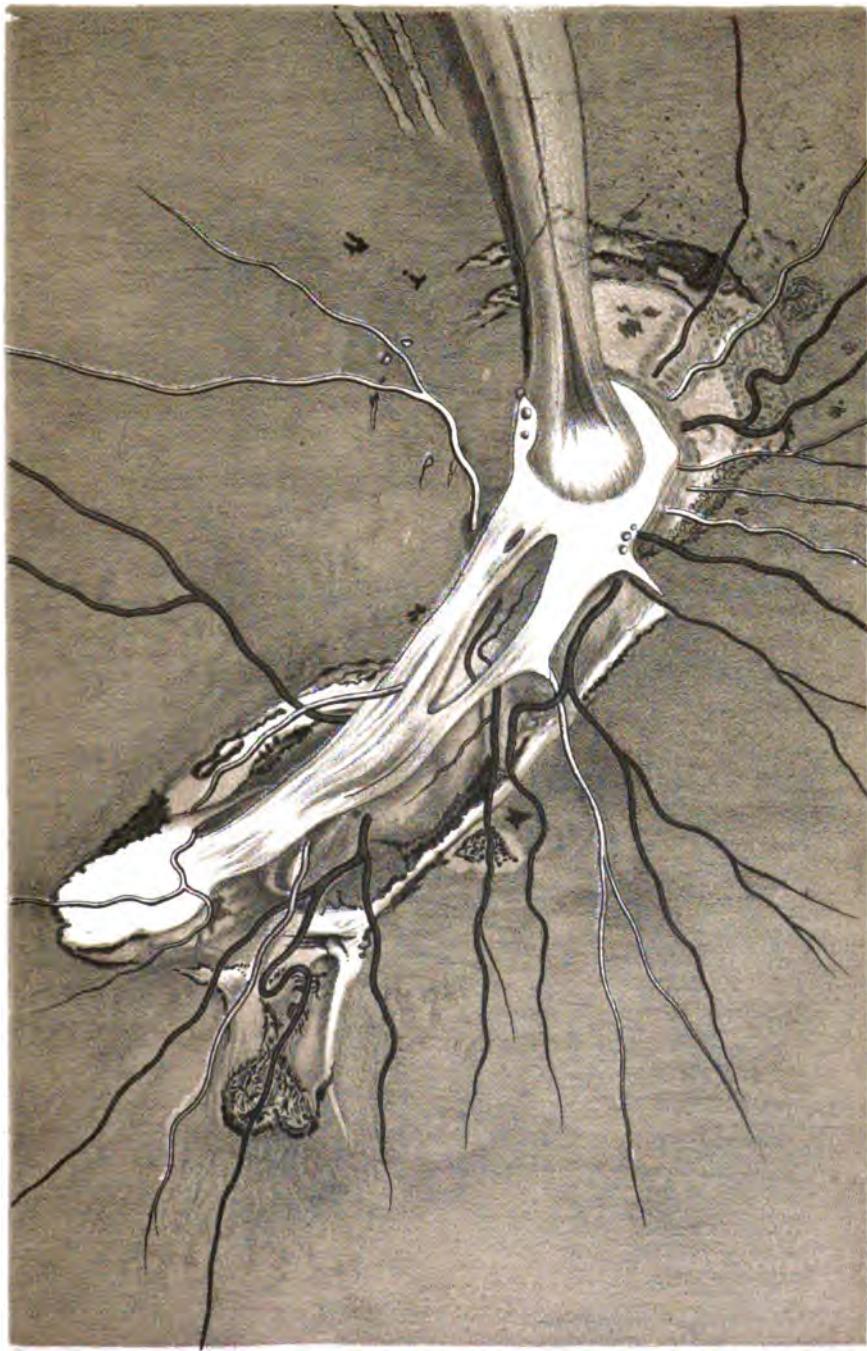
varying degrees of development observed in specimens included under this name.

Cowell²⁰³⁶ reports a case of *congenital malformation of the left eyelids*, with fissure of the upper lid and several supernumerary auricles, chiefly in the neighborhood of the left ear. There was also imperfect closure of the foetal cleft at the angle of the mouth and on the inner side of the cheek; on the left side a distinct groove ran from the imperfectly joined angle of the mouth slightly upward and backward for about two inches. Cowell thinks that the congenital cleft in the upper lid supports the view that the eyelid is formed from two folds: one from the fronto-nasal plate and the other from the skin-covering of the margin of the orbit. Shepard⁷⁷⁶ records 2 interesting cases of *persistent pupillary membrane*. Cassedy⁷⁷⁶ describes a case of *congenital corectopia* in the left eye of a man 45 years of age. The pupil extended downward and inward to the extreme edge of the iris, and was occupied by a mushroom-shaped fungous growth springing from the lower edge of the iris. The right eye appeared atrophied, the cornea being contracted, the pupil completely obliterated, and the iris drawn to a point in the centre. Apparently adherent to the posterior surface of the iris was a calcified mass, about the size of "a small pea." This condition also was congenital. A son, 10 years of age, presented a condition of the left eye similar to that of the corresponding eye of the father. A case of complete *coloboma of the iris, lens, and choroid* is recorded by Phillips.²⁰³⁶ In the left eye the choroidal cleft involved the disc and macula. Doyre²⁰³⁶ reports a case of bilateral coloboma of the iris and choroid, with a bulging of the corresponding part of the lens.

Talko³⁵³ gives an instance of *bilateral coloboma* of the choroid without defect of the iris. The left iris showed, in its lower part, a raphe evidently made by the closing of a coloboma during the foetal period, while in the lower nasal quadrant of the right iris there was a dark spot extending from the pupillary margin to the ciliary attachment, widening toward the latter. In the right eye the choroidal coloboma was very large, extending from the disc on both sides to the ciliary body. In the left eye the coloboma was 5 diameters from the border of the disc, and also extended to the ciliary region, being pear-shaped, with the apex toward the papilla. Beaumont²⁰³⁶ adds a case of left-sided *macular coloboma*, and

Canal of Cloquet and Remains of the Hypoloid System. (Van Duyse.)

Archives d'Ophthalmologie.



Risley¹¹² a case of *persistent hyaloid artery*. Price¹⁰⁰⁷ records an instance of persistent hyaloid artery in an eye containing "a large choroidal patch covering the region of the macula and extending beyond in all directions." In the fellow-eye there was a remnant of the same foetal structure.

The accompanying lithograph gives a most excellent graphic description²⁷⁴ of Van Duyse's interesting example of *persistence of the canal of Cloquet*, with remains of the hyaloid artery and coloboma of the optic nerve. The anomaly is unusual in being confined to one eye, the fellow-eye being normal and emmetropic.

Manz²⁵¹ describes the gross and minute anatomical features of a *congenital coloboma of the optic nerve* of a man, and a brief account of the same anomaly accidentally discovered in the eyes of a young dog. In the human eye the coloboma was the only pathological change noticed. The author thinks that inflammations during foetal life are not a sufficient explanation of the formation of all colobomata of the optic nerve, but he does not deny that these anomalies may be secondary to pathological alterations of the choroid or retina occurring during intra-uterine life. Fig. 3 in the colored plate facing this page shows the ophthalmoscopic appearance of the anomalous condition. Mohr⁸⁴ reports a case of a rare form of *anomaly of the optic nerve-head*. The disc showed a rather broad physiological excavation; near the outer edge and on a level with the horizontal diameter of the disc was an oval, sharply bordered, bright bluish-gray depression, taking in about one-eighth of the whole area of the papilla. The outer, lower border of this depression was overhanging, while the inner and upper was flattened out.

Boucheron²⁷⁴ has studied the *histology of the superficial ciliary nerves* in the human eye. He has shown that these nerves form about the anterior hemisphere of the eye a net-work of nerve-filaments, composed of four or five superimposed layers, from which superficial and deep branches are given off, the deepest of these forming penetrating branches, of spiral form, that unite with the deep ciliary nerves. Toward the cornea these penetrating fibres furnish to the corneal limbus direct branches, and also unite with the episcleral plexus. The peripheral zone of the cornea is, therefore, in part supplied by the superficial ciliary nerves; and Boucheron believes that it is thus easy to explain the possibility of cut-

ting the deep ciliary nerves without endangering the cornea. Again, after section of the deep ciliary nerves, the sensibility of the cornea observed in the outer zones is the result of innervation by the superficial ciliary nerves. The author also claims to have thus reached an explanation of the results obtained by Magendie and Claude Bernard, which seemed to show that the sensibility of the centre of the cornea and that of its periphery and of the conjunctiva were derived from different sources.

An elaborate study by Nicati,²⁷⁴ of *the glands of the aqueous humor* is among the notable papers of the year. Its conclusions are reproduced: "The aqueous humor is secreted by the surface which covers the ciliary processes interiorly from the ora serrata to the commencement of the iris. Conducted by Petit's canal, the depressions of the ciliary bodies and the suspensory ligament, the posterior chamber and the pupillary orifice, it comes into the anterior chamber, where it is absorbed by the lymphatic cavities of the iris. This secretion is the product of one gland,—the uveal gland,—composed of an epithelium (pars ciliaris retinae), of a vascular and serous structure (the chorio-capillary), and of a contractile apparatus (the cilio-choroidal muscle) which accumulates the blood in the iris-wells or vents. There are two varieties of aqueous humor,—the ordinary non-fibrinous and the neuroparalytic, or fibrinous. The ordinary variety is secreted by the glandular epithelium, which interposes itself as a barrier to the salts introduced in the blood. It does not diffuse these salts except when the blood contains exceptionally large quantities of them. Section of the cervical sympathetic favors this diffusion. (In the case of pupillary occlusion, a certain quantity of the humor is produced by the anterior face of the iris.) The liquid of the anterior chamber is submitted to an incessant movement of rotary circulation, which prevents stagnations and opaque deposits on the posterior face of the cornea. The fibrinous variety, which is produced when the anterior chamber has been emptied or the nerves of the cornea divided, is secreted by the interstices between the epithelial cells. Physiologically, it is a reflex secretion, provoked by disturbance of equilibrium between the ocular pressure and the pressure of the blood. The nerves of the deepest layers of the cornea are the peripheral seat of this reflex. The nervous mechanism of the fibrinous secretion consists in an apparatus of



Disposition of fibres in the Ciliary Region. (Topolanski.)
Archiv für Ophthalmologie.

secretory energy, without cessation in tension, situated in the ophthalmic ganglion, and an apparatus of inhibition, situated in the bulb and in the Gasserian ganglion. The reflex, *i.e.*, the secretion, takes place all the time inhibition is suspended, either anatomically, in case of puncture, or directly by experimental section of the trigeminal. The excitation of the iris and the isolated paralysis of the vessels of the eye hasten and exaggerate the reflex. Two affections—glaucoma and detachment of the retina—are dependent upon the uveal gland."

In an article on *the glands of the ciliary body* in the human eye, E. Treacher Collins²⁰³⁶ claims that "there are situated in the region, which experimental evidence has proved to be the point from which the aqueous humor and nutrient fluid of the vitreous are secreted, numerous little tubular processes of epithelial cells, which can be nothing else than glands concerned in *their elaboration*; that the nature of these processes has been hidden by their pigment, and is only rendered evident in bleached sections; that these glands are, like secreting glands elsewhere, subject to attacks of catarrhal inflammation, which give rise to the group of symptoms generally included under the term 'serous iritis'; that, as the result of chronic inflammation, there may be considerable overgrowth of their tissue, which overgrowth preserves a glandular type; and that they may be the seat of tumors, either adenoma or glandular carcinoma."

Topolanski²⁰⁴ presents a valuable study of the *structure of the zonula*. He believes that this membrane is fibrous in origin and structure. He describes with great minuteness the origin, course, and insertion of these fibres, which cannot be traced continuously. He asserts that the area of origin of the zonular fibres begins about 1.55 millimetres from the ora serrata, extends forward and includes the whole of the pars ciliaris retinae, the inner side of the ciliary body, and the ciliary processes. The line of origin at the ora serrata is zigzag, and the insertions of the fibres to the capsule are not circular lines, but zones. He accepts Czermak's classification of the zonular fibres. In the region of the ciliary body the fibres, as can be seen in the accompanying sketch, are arranged into three principal groups, the first of which has its origin posteriorly and is inserted on the posterior surface of the capsule; the next is attached to the circumference; while the most anterior

is inserted on the anterior surface. He believes that the zonula is concerned not only with the suspension of the lens, but also with accommodation, and that its fibres equalize the tension on all parts of the lens. He claims that the term "Canal of Petit" is a misnomer, since in reality there is no canal, but only a series of anastomosing spaces between the zonular fibres, which communicate also with the anterior chamber. Garnier²¹, maintains that the zonula offers little obstruction to currents of fluid, and that the contiguous hyaloid membrane does not interfere with the passage of fluid from the vitreous body to the posterior chamber. The zonula, he says, may be pushed forward by the vitreous, without an increase of the intra-ocular tension. The filtration of fluid ceases and the increase of tension occurs only when exudation or pathological thickening takes place in the net-work of zonular fibres.

An elaborate study by Rieke²⁰⁴ investigates the subject of the *forms and evolution of the choroidal pigment-cells*. After considering their form, he finds that the earliest beginning of pigmentation is in the seventh month of foetal life, although in many individuals pigmentation does not begin until a later period. The fixed connective-tissue cells, the author thinks, must be recognized as the pigment manufacturers. As to the origin of the pigment in the choroidal pigment-cells, he concludes: 1. That the fixed cells in which the pigment is evolved were never wandering cells; neither do they imbibe pigment from these, nor, as Haase maintains, from surrounding liquid-containing coloring matter, but that the pigment is evolved by the metabolic activity of the cells (Virchow). 2. That the embryonal connective-tissue cells of the choroid gradually and irregularly enlarge, send out arms, and become either stellate or spindle-shaped. In the seventh foetal month their specific function first obtains in all of the protoplasm. The scarcely visible pigment-particles appear in the interior of the cell, but not always immediately near the nucleus. This may take place simultaneously in different parts of the cell. The pigment becomes thickened toward the periphery of the cell. A definite connection with the blood-vessels in the early stages of pigment formation is not made out, but the author thinks it cannot be denied that the vessels act, either in furnishing oxygen or nutritive material, or both. He suggests that the pigment-particles may be contractile, thus accounting for their different forms and the later aggregations often found. The most

prolific areas of origin of pigment-cells are the region of the posterior pole and the supra-choroidal and most external choroidal lamellæ. In order to determine the cause of the *light-streak* seen upon the centre of the retinal vessels, Davis²⁴⁹ has reproduced the experiment of Loring, but, with the desire of refuting the first objection raised to Donders, that "the blood-cylinder in the vessels of warm-blooded animals is not transparent," he passed a current of blood from the carotid artery of a cat through the tube, in place of a solution of carmine, and found that the result was similar to that obtained by Loring, *i.e.*, there was a definite light-streak on the tube in front of the reflecting surface, and a diffuse light in front of the non-reflecting surface. This different effect he attributes to the difference in surface behind the two parts of the tube, as in all other respects the cylinders were arranged in the same way. This explanation is supported by the fact that vessels lying on a detached retina, which is practically non-reflecting, do not show a light-streak. To disprove the second objection brought forward by Donders, that "light, after passing twice through the blood-column and undergoing the numerous reflections and refractions on both sides of the blood-corpuses, must be totally diffuse and unfit to produce an image," he placed the thin tube through which a column of cat's blood was flowing under the microscope, using a weak eye-piece and a very weak objective, and obtained a distinct light-streak on the surface of the tube. From this evidence the author believes that the truth of Loring's explanation of the phenomenon is proved beyond dispute.

Nuel⁵² contributes a valuable paper on the *nutrition of the retina*. The choroid, he observes, can be divided into two layers; the external, strongly pigmented, incloses the large vessels, while the internal, entirely devoid of pigment toward the *juxta-retinal* side, carries the vessels of medium size, and, upon its inner surface, the capillaries. These terminal vessels are therefore in contact with the retina, and their number is found to increase considerably in the vicinity of the *macula lutea*, reaching a maximum development at the *fovea centralis*, where most of them have the structure of veinules. The author claims credit for being the first to recognize the preponderant rôle played by the choroidal capillaries in the nutrition of the retina, and cites, in further support of his theory, recent observations of Wagenmann. The anatomical dis-

tribution already noted and the entire absence of retinal vessels at the fovea offer, he considers, additional testimony of the correctness of his view. This disposition of the blood-supply, he further observes, explains the fact that the macular region is the point of election for limited alterations of the choroid, both in high myopias and in all affections of the eye dependent upon syphilis and albuminuria.

Stephenson²⁰³⁶ _{v.ii} has met with 3 cases of *peculiar retinal pigmentation*, occurring in unrelated males under 17 years of age, one eye alone being affected, the pigmentary changes resembling each other so closely that one description serves for all. The changes, which occupied sector-like portions of the fundus, consisted of groups made up of black to dark chocolate-brown spots, ranging in apparent size from one-half to two millimetres, or more, being larger the farther they lay from the disk. The individual dots had, for the most part, a characteristic angular appearance, and the groups formed by the dots assumed various shapes and patterns. The choroid appeared normal between the individual dots and between the groups. The course of the retinal vessels was obscured only in places. The visual fields were not contracted, and visual acuity equaled $\frac{1}{2}$. None of the patients suffered from night blindness. The author considers "the condition one which falls within physiological limits." He says: "One is tempted to think that the development of pigment-cells in the proximal plate of the secondary optic vesicle runs riot, so to speak, and, in overstepping its ordinary bounds, produces these anomalous aggregations of pigment."

In order to test the assertion of Michel, who claimed the total *crossing of the optic fibres* in both lower and higher mammalians, Darkschewitsch²⁰⁴ _{Apr. 20} has undertaken to re-investigate this subject. From his comparative anatomical studies of a series of sections of brains of animals, he concludes that the recent investigations of Michel do not overthrow the older view of Gudden, that there is a partial crossing of the optic fibres in the higher animals. Weiss²⁰⁵ has inoculated the anterior chambers of the eyes of three dogs with material from chalazia, taken in each case from a different individual, one being robust, another anæmic, and the third having phthisis. The results were negative, the reaction soon subsiding and the injected material being quickly absorbed. Even

in the case inoculated from the phthisical person no tuberculosis of the iris developed. As a control experiment, he inoculated some cheesy degenerated gland from a child having scrofulous eye inflammation, and provoked tuberculosis of the iris. He, therefore, denies the view advocated by Tangl, that chalazion is a local tubercular process.

Mitvalsky²⁵⁴ has made an elaborate study of the pathology of *circumbulbar dermoid cysts*, and reports 14 cases with the result of macroscopic and microscopic examination. He discusses at length the structure of these growths, the changes occasioned by their development and distension, and the nature of their contents. Magee²⁶¹ has made an histological study of an eye in which complete *necrosis of the cornea* had resulted from syphilitic ulceration, and which has caused marked "sympathetic trouble." Examination of the tissues with the microscope showed that the canaliculi of the lymph-spaces were crowded with leucocytes, and the corneal tissue proper was markedly infiltrated. Section of the optic nerve behind the lamina exhibited a similar infiltration of the lymph-channels and perineurium.

De Schweinitz²⁴⁹ has made a careful microscopical study of an eye affected with *neuro-paralytic keratitis*, as the result of involvement of the cell-groups of the facial and trigeminal nerves. The condition developed in the course of organic disease, affecting also the *anterior horn* of the gray matter in the seventh cervical segment on the left side of the cord, extending to the adjoining segments and into the crossed pyramidal tracts. The autopsy upon the eye showed a sharply-defined central slough of the cornea, separated by nearly normal corneal tissue from a peripherally situated secondary keratitis, having inflammatory connection with overlying diseased conjunctiva, but bounded below by reasonably healthy cornea; small-celled infiltration surrounding *Schlemm's canal*; inflamed iris and ciliary body, throughout which the arterioles presented a form of arteritis of the type known as mesarteritis; normal choroid, retina, and optic nerve; and *unaffected ciliary nerves*. A number of years previously the eye had been the seat of a severe iritis, resulting in partial occlusion of the pupil. Treacher Collins²³⁰ has found a large *epithelial implantation cyst* in a shrunken globe twenty-eight years after the receipt of injury. Section showed a large cavity occupying the greater portion of the

interior, bounded anteriorly by the posterior surface of the cornea, and presenting posteriorly many elevations and depressions. Between the posterior wall of the cyst and the sclerotic there was some pigment-tissue and bone. Microscopic examination showed the whole of the large cavity to be lined with epithelium, in places laminated, and exactly resembling that found on the anterior surface of the cornea, the cells nearest the interior being the most flattened. In some parts the epithelial lining was composed of but a single layer. A cicatrix was seen just external to Bowman's membrane, leading to the cyst. Imbedded in the scar there was a separate collection of epithelial cells. Situated on the inner surface of the choroid posteriorly, there was some true bone. The author believes that the cyst had been produced by the implantation and subsequent proliferation of a piece of the surface epithelium in the interior of the globe. Galippe,³ starting from the idea that *pathological formations capable of undergoing calcareous change* (calculi, tumors, emboli, etc.) should be considered as of parasitic origin, has essayed to discover whether a cataractous lens contains micro-organisms. Culture experiments have not been entirely conclusive, but in many cases the results have been positive, and here the same micro-organism has been found—a diplococcus. Examinations of the calcareous concretions often found in globes long sightless have shown an organism very closely resembling the diplococcus obtained from the culture of cataractous lenses. The author goes further, and is inclined also to attribute muscæ volitantes to a microbic or parasitic origin. Commenting on the value of such experimentation, Dubief¹⁷¹ details some experiments of his own, which show that, under the most rigid asepsis, micro-organisms, if at all present in cataracts, are in very slight number; and, moreover, if such microbes there exist, they occupy the surface of the lens,—a fact which goes far to suggest an accidental contamination. The variety of such organisms, he further says, permits the belief that their origin is from without, *i.e.*, the conjunctiva, which is capable of infecting the lens itself, or the instruments used in the extraction.

From a series of *inoculation experiments* upon rabbits, Valude²⁷⁴ concludes that the special anatomical constitution of the eye offers a means of isolating and localizing in itself a tubercular lesion, and a power of resisting invasion from an infected

organism much more marked than that of other organs. Moreover, his experiments seem to show that dissemination of tubercular germs takes place not by the blood-vessels, but by the lymphatic channels, which, in the eye, are relatively distinct from the general lymph system. Tuberculosis of the eye, at least the most ordinary form,—that of the uveal tract,—is, therefore, generally of external origin.

As a result of experiments made upon dogs, to determine the lesion in *quinine blindness*, de Schweinitz²⁶ found that "in the sections taken from the cuneus, in all instances the same lesions were present, namely, a remarkable dilatation of the pericellular lymph-spaces, with degeneration of the protoplasm of the cell." He, however, concludes that, "so far as the microscope is concerned, it may be said that, with the single exception of the positive clot found in the central vein, no absolutely positive microscopic lesion was made out; that is, none that might not be attributed to imperfections in technique. As negative evidence, however, it may be stated that, even in dogs blind for more than a month, there is no atrophy of the nerve-fibres in the sense in which we ordinarily use that word; neither is there any appearance in the earliest stage of the blindness of neuritis."

As to the etiology of quinine amaurosis, Barabaschew's experiments²⁵⁴ lead him to the conclusion that an ischæmia of the peripheral parts of the retina, dependent upon central vasomotor changes produced by the drug, is sufficient to cause protracted or permanent alterations in the functions of the retina. According to this author, the injection of a neutral solution of quinine into the anterior chamber, or the instillation of a strong solution into the conjunctival sac, produced no positive results.

Gley²⁵⁵ has observed in a rabbit, as the result of *section of the trigeminal*, a complete anæsthesia of the cornea without trophic changes, although the experiment had been made thirty-three days previously. This fact, he thinks, seems to prove that trophic disturbances of the cornea cannot be due to insensitiveness of that membrane. This conclusion, however, could not be justified, he says, until by autopsy he has proved that the section of the nerve had been complete.

PHYSIOLOGY.

In an article on the *action of prismspheres and decentred lenses*, Percival²⁴⁹ demonstrates that when a spherical lens is placed

in combination with a prism the angle through which the eye rotates is no longer equal to the angle of deviation of the prism. For the exact determination of the absolute maximum of convergence, the author suggests, tentatively, the following procedure: After examination of the refraction and accommodation of the eyes, glasses should be given to bring the near point of accommodation to one-third of a metre. The strongest adducting prism compatible with single vision is now found, and the near point of convergence is determined either by the help of tables (which are appended), or by means of a simple calculation.

In a recent paper entitled the "Prismometric Scale," Prentice²⁴⁷ has shown that an error is committed in *measuring prisms of comparatively high degree at short finite distance*, and, therefore, recommends that selections which are made from prisms above 10 degrees should be measured upon a paper scale, which he describes as consisting of a series of heavily-drawn linear graduations, six centimetres apart, each interval of the scale representing the value of 1 prism-dioptre, or the proportion 1 to 100, when the scale is placed at exactly six metres from the prism which is subjected to measurement. The author has found that varying thickness between the base and apex-edge of a prism is clearly shown to result in correspondingly varying estimates of the prism's deflecting power when measured upon a scale at short finite distance, the discrepancies being due to *oblique* incidence of the rays emitted from the object of fixation, which is the index-line of the index-plate of the prismometer.

In an article on the proposed *methods for numbering prisms*, Duane²⁴⁸ states that "no system of prismatic enumeration is altogether satisfactory, since, whatever system we follow, the number that we assign to any given prism holds good for but one position of it, and represents a value which is constantly varying with the variations in the relative places of the prism and the objects viewed through it." Among the merits claimed by Burnett²⁴⁹ for the *prism-dioptre* are the facts that the new system introduces no new standard; that it is possible to get the desired prism, even to the $\frac{1}{100}$ of a prism-dioptre; that there is simple and direct connection between the prism-dioptre and the metre-angle; that the prismatic action of decentred lenses is determined with exactness, and that it entails no revolution in the present method of manu-

facture. In reply, Randall²⁴⁴ says that "the *centrad* has practically every advantage claimed for the prism-dioptr, without its inaccuracies; it can hardly be called, like its rival, the arbitrary choice, and it is in accord not only with practical and scientific ophthalmology, but also with the most advanced mathematical science." Holden²⁴⁹ contributes a paper the purpose of which is to demonstrate, mathematically, the "*changes in the function of lenses whose axes do not coincide with the visual axes* ; further, to show in what circumstances these changes are to be avoided and in what circumstances they may be utilized, and to give such formulæ and tables as may make it possible to employ these in routine practice." He gives, as a practical rule for finding the decentring necessary to produce the effect of any prism in any lens, to multiply 0.22 millimetre by the number of that prism, and this product again by the focal distance of the lens. If working with dioptries, the rule is to "multiply 8.7 millimetres by the number of the prism, and for any lens divide this product by the number of dioptries of the lens."

In a study of the *form of the cornea and its influence upon vision*, Sulzer²⁷⁴ presents a number of diagrams showing the remarkable "asymmetry" of the corneal meridians in many cases. These irregularities, he says, produce considerable differences between the astigmatism of the periphery and that of the central part of the cornea. Adding to this the variations in the pupillary diameter and the fact that the visual axis does not coincide with the pupillary centre, the author finds sufficient explanation for the differences between ophthalmometric and subjective findings, without having recourse to the theory of crystalline changes.

From results of estimations of the *indices of refraction of the different layers of the crystalline lenses of animals of various ages*, Bertin-Sans²⁷⁴ July, Aug. concludes that Woinow's observations are correct, and that, contrary to the general opinion, the refractive power of the crystalline increases with age. Knies²⁵⁴ publishes a valuable paper on *central disturbances of the functions of the voluntary ocular muscles*, which may be considered as supplementing the anatomical study presented last year by Perlia, whose deductions he accepts as a basis for his own investigations. (See ANNUAL, 1891.) Van Rijnberk, of Amsterdam, corresponding editor, gives us a *résumé* of the thesis of Van Eyselsteyn.²⁰³⁷ Oct. 22 The

author's conclusion is that "with the glance sidewise the power to converge is impeded, and connected with it is a decrease of the power to accommodate."

In the course of some experiments undertaken to discover the *smallest angle through which the eye can move*, Landolt, of Paris, corresponding editor, ²⁷⁴ has found that, in running along a line of figures or print, the eye does not pursue a smooth continuous course, but advances by a series of jerks, which are more numerous as the characters are smaller and less familiar. This opens up a new field of investigation which the author hopes to pursue further. Herz ¹⁸² _{14, p. 25} has made an elaborate investigation of the *movements of the eye through different meridians*. By means of a specially constructed apparatus, he was enabled to note and record the paths followed by the eye in rapidly moving over the different meridians of a circular screen placed at a distance of 70 centimetres. He states that, although the lines of motion are manifold, they can be classified into three groups, and, if represented on the surface of a circle, would be (1) straight lines which either do or do not pass through the centre, (2) lines of varying curvature having their concavities toward the centre, and (3) figure of "S" lines.

Alfred Graefe ²⁰⁴ calls in question the view which he formerly held, and which is generally accepted, that it is easier to overcome the *displacement caused by prisms* with their bases out than that caused by the reverse arrangement. He shows that, theoretically, divergence and convergence have the same range, and, taking the maximum of this quantity as 21 metre-angles, he proves, by simple trigonometrical calculation, that at any intermediate distances the efficient powers of abduction and adduction are supplementary; when one, for instance, is represented by 18 metre-angles, the other is 3 metre-angles; so that there is a point distant 82 millimetres, where potential abduction and adduction are equal; but for comfortable use he has found that these opposing forces must bear the relation of 18 of adduction to 3 of abduction. He further shows that adduction fusion-power predominates at all distances between infinity and 82 millimetres, while between this point and the punctum proximum abduction fusion is the stronger. To the fact that previous experiments had been made within the former limit, the author attributes the view hitherto enunciated.

From the study of a case of paralysis of normal "visual" convergence, with preservation of "voluntary" convergence, Van Millingen¹⁷¹ asserts that the *centres for convergence* are connected with the optic region, as well as with the cortical, and that either of these connections may be broken while the other is preserved.

Morat and Doyon^{211, 3} have made an interesting investigation of the *mechanism of accommodation*. Upon a curarized animal, in which spasm of accommodation was produced by eserine or nicotine, the sympathetic was cut and its proximal end stimulated. Immediately, the image of Purkinje corresponding to the anterior surface of the lens was seen to increase in size, thus showing a marked flattening of the anterior curvature of the lens; in other words, the eye had been brought into accommodation for distant vision. This effect is attributed to an inhibitive action of the sympathetic operating through the ganglionic plexus of the ciliary muscle. Thus, the authors assert, the accommodation of the eye is controlled by the opposing actions of the sympathetic and the oculo-motor nerves.

From a study of 2 very similar cases of *traumatism affecting the ophthalmic ganglion* of one side, Querenghi²⁷⁴ concludes, as to the physiological relations of this ganglion: (1) that through the ophthalmic ganglion pass the motor fibres that innervate the muscle of accommodation; (2) that through this ganglion pass the fibres causing pupillary constriction, in response to a light stimulus falling upon the same eye; and (3) that the pupillary fibres which cause response to a light reflex from the other eye and to the movements of convergence proceed directly from the brain-centres, without the mediation of the ophthalmic ganglion.

Van Rijnberk, corresponding editor in Amsterdam, sends us an abstract of the recent thesis of Grijns,²⁰⁸⁸ which seeks to further establish a *centrifugal action of the optic nerve*. From experiments on frogs, the author concludes "(1) that the electric current through the skin experiences a strong influence when light falls in the eye, whereas light has very little influence on the skin; (2) that, in a galvanic way, a reflex of one eye on the other can be proved that goes along the optic nerve, which is another proof of the nervus opticus conducting centrifugally." Chauveau's experiments⁹¹⁶ lead him to assert that the *excitation of one retina*

by colored light influences not only the perceptive centres which correspond to this retina, but also those of the opposite side, giving them the aptitude to distinguish in white, for example, the exciting color, while the centres of the excited retina see in the white only the complementary color.

Bristowe² suggests that the "*watered-silk*" appearance of the retina which is seen in the eyes of some hyperopic children is due to fine, parallel striation, such as is described by Schultz as existing in living ganglionic cells. He accounts for the absence of this condition in adults by assuming that differentiation of nerve-cells becomes less marked in increasing age; and explains the appearance of the sheen in some cases, and not in others, by supposing a slight differentiation in the intensity of the striation.

Hesse³ reaches some interesting conclusions as the result of experiments upon animals to determine the *effects of section and irritation of the cervical sympathetic nerve*. In dogs and cats, he finds that during life and immediately after death the eyes protrude when the nerve is irritated and retract when the nerve is cut. In rabbits, however, during life, these phenomena are reversed, but immediately after death the same effects as in dogs and cats are noted. These movements of the globe are also attended with a certain degree of rotation, which varies in different animals. In explanation of these changes, the author states that in the rabbit irritation of the sympathetic causes the orbital vessels to contract, and, as a result of this anæmia, the eyeball recedes; while section of the nerve results in palsies of the walls of the vessels, with hyperæmia and protrusion of the eyeball. The unstriated orbital muscle of Müller antagonizes the former tendency; but its action in the rabbit is too feeble to overcome the recession, much less to cause a protrusion of the globe. It can only occasion the latter when the functional activity of its antagonist is removed, as in the dead animal. It must therefore be concluded, he thinks, that the changes in the position of the eyeball dependent upon the innervation of the sympathetic nerve are governed by two factors: the orbital muscle and the vessels of the orbit—factors that, on stimulation or on section of the nerve, have a tendency to antagonize one another. In consequence of the varying activity of both factors in different animals, the results of irritation of the

sympathetic upon the movements of the eyeball vary as one or the other factor predominates.

The experiments of Boddaert, who succeeded in producing *exophthalmos* by *ligating the four jugular veins and severing the cervical sympathetic* on each side, have been repeated and confirmed by the younger Stilling.^{3,10} He found, however, that the same result could be produced by ligature of the external jugulars and section of the sympathetic upon only one side. Extirpation of the superior cervical ganglion did not increase the proptosis caused by the ligations, and bilateral division of the sympathetics seemed rather to diminish than increase it. Bouchard^{3,19} states that he has produced exophthalmos experimentally by the intra-venous injection of normal urine.

Becker¹⁹⁰ describes an apparatus furnished with *movable test-letters* and designed for use in cases requiring frequent tests of the vision. Guillery²⁵⁴ discusses the disadvantages and inaccuracies of the present *method of testing the vision*, and proposes a simple and more accurate method, as he claims, by the use of dots instead of letters. The basis of his system is a dot, which, at a distance of 5 metres, is seen under a visual angle of 50 seconds, and has a diameter of 1.212 millimetres. The area of this dot is related to the areas of the succeeding dots as the numbers 1, 2, 3, etc.; and the vision is denoted by the fractions $\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{3}$, etc.

As explained and described years ago by Dudgeon, Stevenson³⁴⁷ suggests that *hollow air-containing lenses* might be constructed, which would enable one to have distinct vision under water.

The following rules are suggested tentatively by Beaumont² as a basis on which to found regulations with regard to *examination of the vision of railway officials*: "1. The tests shall always be applied by qualified medical men. 2. No one shall hold the post of guard, signalman, driver, or fireman, whose vision is less than $\frac{1}{2}$ in either eye, or whose vision is not normal in all respects. 3. The vision of all such officials shall be examined at intervals of not more than one year, and if, in any case, the sight is found to be less than the standard, such official shall be transferred to less responsible work." Adler⁸ proposes to substitute *colored pencils for yarns* in testing the color-sense. The advantage of using pencils consists in the permanent record that may be made with them.

A new case of achromatopsia is recorded by Landolt, of Paris, our corresponding editor.²⁷⁴ After comparing this case with the 3 previously observed by him, he believes that the symptoms—diminished visual acuity, limitation of the visual field, and anaemia of the fundus—point to a congenital peripheral malformation affecting the optic nerve and retina. Noiszewski²⁷⁵ proposes to explain the *memory of visual impressions* by the occurrence of chemical changes in the terminal extremities of the rods and cones of the retina, as a result of which electric currents are generated that transmit like impressions to the cells of the cerebral visual centres. The memory of simultaneous impressions lies in cells situated side by side; that of impressions different in time of occurrence lies in cells situated one behind the other; every new impression occupies a new part of a cell or of a nerve-fibre termination.

SECTION II.

ERRORS OF REFRACTION AND ACCOMMODATION.

Martin²⁷⁶ maintains the existence of *partial contractions of the lens* as a means of subjective correction of corneal astigmatism, and makes an able reply to the new theory of Tscherning and Bull, who attribute such correction to an obliquity of the lens. He holds that in a great majority of cases the differences observed between the subjective and objective examinations depend upon these contractions, and cites in support, first, the well-known effect of atropine, which could have no such action upon the obliquity of the lens; secondly, the instability in the degree of subjective astigmatism, despite the intervention of a mydriatic; and, thirdly, the instances where a cylindrical glass is accepted without its usefulness being indicated by the rayed test-card. While not denying absolutely the idea of correction by obliquity of the lens, the author awaits more convincing demonstration. Nimier,²⁷⁷ in describing the method of employing the *optometer of Scheiner and Parent* in combination with the ophthalmoscope of Parent, says that he believes that it furnishes a very satisfactory means of determining the subjective measure of the refraction. From the results obtained in the examination of 139 eyes with the *ophthalmometer of Javal and Schiötz*, Story²⁷⁸ asserts "that when the ophthalmometer records no astigmatism none will be found by any

other test, and that when an ophthalmometrical astigmatism of a given amount is present cylindrical glasses will probably be required some 0.5 dioptre weaker than those indicated by the instrument." He considers "a saving of time the most important advantage possessed by the instrument." For the estimation of astigmatism by the ophthalmometer of Javal and Schiötz, Burnett⁷¹ has formulated the following law, to which he believes there are only occasional exceptions: "For the total subjective astigmatism, subtract 0.5 dioptre from the corneal astigmatism when it is according to the rule, and add 0.5 dioptre if the corneal astigmatism is against the rule."

From a study of the workings of the ophthalmometer of Javal and Schiötz, Ostwalt⁷² reaches the following conclusions: 1. This instrument indicates the radius of the cornea as exactly as the precision of the instrument permits. 2. The number of dioptres indicated is one-fourth too large. 3. The astigmatism of the cornea, therefore, does not reach in reality but to three-fourths of that found by the ophthalmometer. 4. A great part of the changes which have been attributed to the correcting contraction of the ciliary muscle is explained by this difference between the values indicated by the ophthalmometer and the true values of the corneal astigmatism. 5. The precision of the instrument in question is not so great that one can count upon an exactitude of measure of the radius within 0.1 millimetre. For this reason, the astigmatism found by the aid of the ophthalmometer can differ from the true corneal astigmatism by more than $\frac{1}{2}$ dioptre, on one or the other side. If this error is added to that indicated under conclusion 3, the subjective astigmatism will differ so much the more from that observed by the ophthalmometer, *i.e.*, the apparent correcting contractions of the ciliary muscle will be so much the more energetic. If, on the contrary, this error, which may be called intrinsic, compensates the other error, the cylinder accepted by the patient will correspond to the indicated astigmatism, and there will be no correction of the crystalline astigmatism. In cases where the intrinsic error is contrary and greater than the other, there will be an apparent overcorrection on the side of the lens. 6. The results and conclusions of observations hitherto made by the aid of this instrument should be carefully revised. 7. The ophthalmometer of Leroy and Dubois has much greater precision than

Javal's, and, with slight modification, will furnish a perfect clinical instrument.

A later paper by Ostwalt, ⁷⁸ discusses the subject of the *refracting power of the cornea*, and pursues the same line of argument, as just given, in more minute detail. Würdemann, ³⁴⁷ has devised a *skiascope* which, as shown in the sketch, consists of an oblong blade of hard rubber, in which are inserted 12 plus and 12



WURDEMANN'S HAND SKIASCOPE.
(*Revue Générale d'Ophthalmologie.*)

minus lenses. In using the instrument the patient raises or lowers it at the desire of the examiner, so as to bring the required lens in front of the eye. Chisolm, ³⁴⁷ finds the *use of homatropine* entirely satisfactory for the estimation of refraction errors. He regards the aqueous solutions as painless, and in this respect superior to the oleates.

From an examination of the eyes of 3002 children attending some of the Aberdeenshire Board Schools, George Ferdinands, ² found that a large percentage (13.4) of *myopia* exists, especially in the schools where education is pushed; while in the country schools the percentage of myopia is small, never rising above 10 per cent. Dowling, ⁷⁰⁰ examined the eyes of 1000 scholars in the private and public schools of Cincinnati, and found over 300 cases of myopia. Most of these, probably 70 per cent., were of a low degree, and occurred principally in the elementary divisions, but in the more advanced school-grades there was much

larger percentage of "the higher degrees of the disease." Risley, ¹¹² directs attention to the injurious effects upon the eyes of the growing child produced by the *system of term-examinations* now in vogue in our schools, saying that he "cannot refrain from suggesting, even at the cost of seeming presumption, that, in view of the great strain upon the physical endurance of the children, better results could be reached in the end by a more careful and persistent effort to fix the lessons of the term upon the mind by frequent reviews and careful teaching throughout the term, and by allowing the class standing and fitness for promotion to be determined by the

marks for recitation, and by the teacher's knowledge of the pupil gained by daily contact."

As a means of providing for the *education of those whose capacity for eye-work is permanently or temporarily below a fair general minimum*, E. Jackson²³⁴ suggests "the establishment of special schools, departments, or classes, in which the ordinary branches of learning should be efficiently carried forward by methods that would entail but little close application of the eyes." Andrews¹⁵ says: "Since *headache* is a common condition *in children*, and errors of refraction constitute the rule in them, as in all ages, I believe that the relation of the one condition to the other is not determined by bringing together statistics to show that the headache is always associated with refractive errors, because the latter are almost always present, and it would be the exception not to find them; but we should rather seek for the proportion of cases of headache in which correction of the ametropia affords relief." Andrews'⁵¹ experience has been that the majority of school-children who apply for treatment of headache are relieved by correction of existing ametropia, and that attending muscular phenomena very rarely require correction "after the use of prisms." Freeman²⁰² denies that *type-writing* is necessarily injurious to the eyes, and adds that from his own experience he "is firmly convinced that physicians, instead of finding fault with these admirable contrivances, ought to be the strongest advocates of their more extended employment." Voit³⁴ thinks that the State should institute in the schools two modes of writing: one by the use of vertical script, with the edge of the written lines parallel to the desk but opposite the middle of the body; the other method differing only in the use of oblique script. If accurate observations were made for several years, and all irrelevant factors excluded, he thinks that positive conclusions as to the effects of these methods upon the spinal column and the eyes could be reached.

After a study of *myopia* among the candidates for the military schools of France, Nimier¹⁷¹ thinks that the civil authorities should assume the duty of examining the eyes and correcting the refraction of all young men preparing to enter the military schools. By this means, he believes, many candidates will be saved from rejection at the examinations because of myopias above the limit admitted, and, also, benefit will accrue to the army in raising

another obstacle to the development of higher myopia among its future officers. From a series of investigations made among the soldiery, for the purpose of testing Cohn's statistics, Hoor²²³ fails to find justification for these conclusions. Out of a total of 87 cases, he found 49 which showed no evidence that the myopia was caused by near work; while in 37 cases, distinct heredity was proven. He thinks that the highest grades of myopia (6 to 20 dioptres) can be positively ascribed to hereditary predisposition. Further statistics, drawn from private practice and other sources, are brought forward as additional confirmation of his view. In a timely paper, Gorecki¹⁷⁷ considers the alarming increase of acquired myopia. He thinks that much good can be done by attention to the general hygiene of the school-room, by securing good lighting, clear printing of text-books, and rational methods of instruction, which should be largely oral, or by blackboard teaching. Theobald⁷⁶⁴ gives the notes of a case of inherited monocular myopia, occurring in a boy 9 years of age. The right eye had a myopia of 10 dioptres, and was slightly divergent, while the fellow-eye had a low degree of hypermetropic astigmatism. The patient's mother's eyes presented exactly the same conditions. The maternal great-grandparents were both myopic. An interesting table showing the refraction anomalies found in the succeeding generations is appended, and presents what the author considers to be strong evidence against the advisability of myopes intermarrying.

Hirschberg¹⁹⁰ reports 2 cases of persistent *muscae volitantes*, caused primarily by retinal haemorrhages, in myopes of high degree. He believes that *muscae* from this cause may last for years, and, in some instances, may be permanent. Weiss²⁵⁴ reports 5 cases in which a high degree of myopia was associated with a sharply-defined ectasia at the posterior pole of the eyeball, distinctly different from the so-called posterior staphyloma. In these cases, a well-defined diverticulum existed, the alteration in plane being readily recognized by the course of the retinal vessels. The author believes the condition to be extremely rare, having observed it in only the 5 cases reported, and being unable to find any similar observations in medical literature.

The following conclusions are drawn by Bates¹ from the results obtained in the treatment of a series of cases of myopia,

by the use of tonics, counter-irritation, etc.: (1) Vision in many cases of myopia can be improved very much by treatment without glasses, and frequently this improvement is so marked as to render glasses unnecessary; (2) an astigmatism of even 5 dioptres does not interfere with the good results; (3) the greater the myopia and the older the patient, the longer the time necessary to obtain the best results; (4) the use of glasses during the treatment must be prohibited.

Javal¹⁰ maintains that, in the so-called *hereditary myopia*, it is not the ocular defect, but simply a predisposition to its acquirement, that is inherited, the short-sight being developed from careless habits of reading, favored, very often, by an inherited astigmatism. Therefore, the most important step in preventing myopia, he thinks, consists in correcting the astigmatism and keeping a careful watch upon such children, and even (as he says), in some cases, prescribing *convex* glasses.

Deeren¹¹ calls attention to the danger of the *development of myopia* by the formation of a posterior staphyloma, in patients with spasm of accommodation who are compelled to do continuous close work. He advocates carefully chosen glasses for all hyperopic children and adults, and enjoins frequent periods of rest. Myopic students, he thinks, should have two pairs of glasses. By such careful attention, he believes that many of the dangers arising from high degrees of myopia can be avoided. Goupillat¹² cites the case of a young man of 30 years, myopic 6 dioptres from the age of 6 years, in whom the myopia is said to have disappeared as the result of a complete paralysis of accommodation due to syphilis. Speaking of this case, Martin¹³ says that he believes that if paralyses of accommodation were more frequent, there would often be observed a disappearance of myopias, more or less strong, which had resisted cure by atropine. He cites the case of a young girl with 16 dioptres of myopia in one eye and 20 dioptres in the other, which, by the aid of suggestion, were momentarily reduced to 2 dioptres. The case had been considered an example of the axial form. Again, in old people, he has observed 3 instances of myopias which have entirely disappeared since the extraction of cataractous lenses. Their myopia had been measured by concave glasses of — 6 to — 7 dioptres. The author's observations, conjoined with Fukala's well-known experiments, lead him now to believe that the part due to increase of the

antero-posterior axis is less considerable and that axial myopias are less frequent than is generally supposed.

Macbride⁷⁶ claims to have obtained beneficial results from the employment of *eserine in spasm of accommodation*. Bissell⁷⁷ states that he has found *ametropia the most frequent cause of true ciliary spasm*, and especially a hypermetropic astigmatism of from 1 to 2 dioptres; or the same amount of astigmatism to a moderate amount of hyperopia. He believes this to be particularly true if anisometropia of at least $\frac{1}{2}$ dioptre exists. The author thinks that due importance has not been given to exophoria as an etiological factor.

As to the etiology of congenital amblyopia, Martin¹⁷¹ concludes (1) that this defect is due to a special anaesthesia of the retina, caused by the fact that rays of light which do not meet in a focus are incapable of developing in this membrane the necessary degree of sensibility. 2. What is true with astigmatic patients should be true in the case of subjects affected with a monolateral uncorrected hypermetropia or high myopia,—a general anaesthesia in all meridians should be manifested. 3. In a great number of these cases retinal anaesthesia is not the only factor; the visual defect is often increased by disuse (monolateral amblyopia) or by retinal congestion (bilateral amblyopia). 4. The improvement which results from the utilization of a congenitally amblyopic eye (without, or better, with the aid of glasses) is the more pronounced as the element of retinal anaesthesia is less. Wilbrand⁷⁸ proposes substituting for the term *neurasthenic asthenopia* that of *nervous asthenopia*, because the latter characterizes not only neurasthenia, but all other varieties of neuroses. So-called anaesthesia of the retina, he believes, is the expression of a general neurosis. From a series of 45 observations, he says, he has been able to demonstrate that disorders of cutaneous sensibility are extremely common, in association with peripheral amblyopia of the visual field, without evident lesion. The same symptoms as in nervous asthenopia may be observed in many cases of traumatic neuroses.

In his reply to Woodward, Roosa¹ gives the following as his conclusions concerning *asthenopia*: "1. I believe that the general nervous condition, especially the nutrition of the nervous system, will have very much to do in determining the causes of asthenopia, even in the cases with considerable errors of refraction.

I point to the asthenopia after typhoid fever, which finally disappears without any special treatment, as an index to what is meant by this conclusion. 2. In what is comparatively a fixed condition—that is to say, a decided deviation from the ordinary standard in the eyeball—is, to my mind, a most probable local source of asthenopia. Muscular insufficiencies result from these deviations. This is illustrated in a marked way in strabismus. 3. The ophthalmologist must not ignore the fact that the standard of emmetropia laid down by the writers from 1850 to 1875 is incorrect. Since then it has been pretty clearly shown, and is capable of wide demonstration, that ametropia exists in at least 90 per cent. of the human race. 4. It must not be forgotten that neurotic patients will submit to any treatment, even to ocular tenotomies, month after month and year after year, in the vain hope of finally achieving what is impossible for some individuals—that is, the use of the eyes as long as they choose under any conditions without any discomfort, or until they derive complete immunity from ailment and pains, which heredity, evil habits, or environment render impossible. Patients cannot be made over. An admission of this, and less ambitious hopes for the cure of neuroses, will prevent the profession from making statements that only serve to bring our scientific men into disrepute."

Callan⁶¹ is forced by experience to regard *eye-strain* as the cause in over 75 per cent. of all cases of functional headache and migraine. Chisolm's³⁴⁷ experience enables him to formulate for his own guidance the axiom: "Headache under eye-use, with acute vision, in by far the majority of cases, means astigmatism, and usually of a low degree." He says: "Long-continued and persistent headache, with eyes paining on use, uninfluenced by rest, medication, or hygienic influences, and relieved at once by a 0.25 D. cylinder, ought to be proof enough of the necessity for discovering these low degrees of deviation from the true corneal curves." Dodd⁵³ finds that it is among patients with low degrees of *astigmatism* that the most troublesome asthenopic symptoms are met. G. C. Savage¹⁰⁰⁷ asserts that in all cases of "*oblique astigmatism*," unless the obliquity is in the same direction in the two eyes, and the astigmatism the same in kind and quantity, double vision would result, were it not that a compensatory rotation of the globe takes place. The author believes this to be accomplished by the harmo-

nious symmetrical action of the oblique muscles. In a case of *alteration of refraction from hypermetropia to myopic astigmatism*, reported by Ayres,³¹⁷ the change was preceded and accompanied by asthenopia of such severity as to necessitate the abandonment of near work. Knoepfler¹⁸⁴ gives several tables, by which corrections may be made in the *strength of spectacle-glasses, according to their distances from the surface of the cornea*. Wall¹⁹⁸ makes it a *rule to correct astigmatism down to the lowest degree* in which it may exist, as he has found that minor degrees of astigmatism, with a sensitive retina, "will cause more trouble than the larger ones, where the retina has never been used to distinct images." Jackson⁶¹ considers it a cardinal rule to give the *full correction for ametropia*—a "rule to which exceptions are to be made, but only for special clearly-marked and important indications." Gould⁶¹ states that, instead of aiming at an ideal emmetropia, he finds that he is "commonly aiming at an ideal of slight myopia, varying in degree from 0.37 to 2 dioptres in myopia, and from 0.12 to 0.75 dioptrē in hyperopia." He finds that, "in a myope, this can be instituted at once, but in a hyperope never at once (unless it be for near work), but often in the course of time, or by means of a second pair of lenses for near work, though presbyopia proper is a long way off."

In considering the question of correction of refraction errors, Randall^{61,10} concludes: "1. Errors of refraction are present in the great majority of cases, but need correction in only a portion of those who suffer with eye trouble. 2. In all correction of refraction errors, the manifest refraction is as uncertain a basis as a quicksand, and the static refraction is the only true basis on which to work. 3. A mydriatic is often required in order to give the eye a needed rest and to measure correctly the refraction, and it must be used to the extent of total ciliary paralysis to meet this end, as a small remnant of accommodation is sufficient to mask astigmatism as well as hypermetropia. 4. The glass, as determined under full mydriatic paralysis, measures the true static refraction of the eye. 5. The glass given should accord with the static refraction of the eye, being modified only for good and definite cause. 6. The minutest accuracy is desirable as to the strength and the fitting of the glasses, and the width of the optical centres should be exactly prescribed. 7. The balance of the ocular muscles should be strictly studied in every case, since these relations have important

bearings upon the ordering of lenses. 8. If these matters have been properly studied when the case is first seen, there is rarely any need of delaying the ordering of the glasses until the accommodation has returned." From an analysis of 100 cases of astigmatism contrary to the rule, de Schweinitz⁶¹ ₈₉₋₉₁ concludes: "1. That the associated symptoms in these cases of astigmatism were not more severe than those which probably would have been found in a similar number of examples in which the refraction error was according to the rule. 2. That useful results follow the correction of the least degrees of measurable astigmatisms,—results which are not obtained when this correction is neglected, and that the mere presence of so-called normal central vision, according to the ordinary best standards, does not preclude the possibility of low degrees of astigmatism being present, which should be sought out and corrected. 3. That ocular health is conserved by such careful and thorough measurements of astigmatism, and hence, indirectly, general or so-called reflex disturbances are alleviated, but that these latter should never be ascribed solely to the astigmatism simply because this is present, when they may be the evident pointings of nature for relief to be obtained by measures directed toward a constitutional vice or an insufficient nervous tone. 4. That the importance of low degrees of insufficiencies of the ocular muscles should not be estimated until the effect upon them of complete correction of the astigmatism has been obtained. 5. That while no doubt, in careful hands, excellent results may be obtained by ophthalmometry and skiascopy without mydriasis, the patient does not obtain the very benefit which is often most essential by the use of the mydriatic, namely, its local sedative influence and the complete rest which a prolonged paralysis of the ciliary muscle entails. The most perfect correction placed upon an eye the subject of symptomatic retino-choroidal disturbance fails to fulfill its function until the former has been subdued, and, in its subjection, prolonged mydriasis plays an essential part."

In order to prevent an *overcorrection* in cases of *aphakia* with astigmatism, a circumstance which often happens in the case of strong lenses when ordered after the usual manner of testing, Dimmer³⁵³ ₁₉₁ recommends that the refraction be tested by using a *plano-convex* spherical lens in front of the cylindrical lens in the trial-frame. This conclusion is arrived at after a careful optical

calculation. Speaking of the fact that *sphero-cylindrical glasses* ordered for patients *after cataract extractions* often do not seem to correspond to the combination prescribed, Bagnérus⁵⁷ remarks that at the time of trial the two test-lenses are separated by a certain appreciable distance, which is not present in the compound lens furnished by the optician. This difference, he says, amounts to about a dioptre higher in the resulting compound glass, and should be always remembered. In prescribing for *presbyopia*, Claiborne⁸¹ says that the rule should be to "please your patient."

SECTION III.

DISEASES OF THE ORBIT.

Weiss¹⁸⁴ details an interesting case of *fracture of the roof of the orbit* of a child by the penetration of a sharpened lead-pencil. Optic neuritis, from pressure of the fragment of bone upon the nerve, was noted. Williams²⁰³⁸ has seen a case of *arterio-venous aneurism of the orbit* in a boy 14 years of age, resulting from a blow on the temple. Ligation of the common carotid artery resulted, finally, in cure. Bullar² reports a case of "*pulsation of the orbit*" in a woman 38 years of age. At each systole of the heart the right eye advanced about one-eighth inch and then returned to its natural position. No bruit could be detected. A case of *pulsating exophthalmos* on the right side, following a fall on the head, is reported by Wing²⁴⁹. Examination showed a pulsating tumor at the upper and inner angle of the orbit. The pulsation ceased upon pressure being made over the common carotid artery. Ligation of this vessel was followed by recession of the globe and increase of vision from one-twentieth to one-half.

A case of *splinter-wound of the orbit*, in a boy of 10 years, is reported by Dulles.⁹ Examination showed that the piece of wood had passed in a downward and backward direction, apparently through the eyelid and the inner and upper part of the eyeball, and was firmly imbedded in the bony wall of the orbit. After failing to remove it entire by traction on the projecting end, a search was made in the upper part of the nasal fossa, where the remaining portion was found and removed. No injury was done to the eyeball. Gayet²¹¹ extracted from the orbit a rivet about

one centimetre in length. Higgins⁶ removed from the orbit and frontal sinus a corroded piece of knife-blade which had remained *in situ* for forty-six years and given rise to a fistulous cicatrix. A careful study of *abscess of the frontal sinus* has been made by Guillemain,²⁷⁴ *Jan. to Apr.* who advocates the treatment suggested last year by Panas (see ANNUAL, 1891)—trephining and drainage by the natural passage from the sinus to the nasal fossa. In a female patient of 61 years, Chaltin⁴⁵⁴ *Aug.* has seen *periostitis and caries of the margin and roof of the orbit*, which was cured, after many remedies were ineffectually employed, by the local use of iodoform ether and iodoform crayons. Dunn⁸¹ *Oct.* records a case of *orbital cellulitis following facial erysipelas* in a patient 74 years of age. Several days before the onset of the affection a number of large polypi had been removed from the nasal chambers. T. H. Wood¹⁰⁰⁷ *Oct.* reports 3 extremely interesting cases of *orbital inflammation*, in 2 of which the trouble was *due to diseased teeth* of the upper jaw. Vignes¹⁷³ *July* has observed, in a girl of 3 years, an *orbital dermoid cyst*, the size of a small hazel-nut, situated between the inner canthus and the surface of the nasal bone. Its removal showed that it was attached by a slender pedicle to the fronto-ethmoidal suture. It contained a whitish, granular magma, with some hairs. The granular material was formed of epithelial cells more or less altered, some showing nuclei. The inner wall of the sac contained some hair-follicles and a few sebaceous glands. He believes that the presence of this cyst can only be explained by a foetal inclusion of the ectoderm in the fronto-maxillary suture, by a coalescence of the external nasal bud and the maxillary bud behind the lachrymal opening. The texture of the sac, he believes, supports the theory of Verneuil. The diagnosis of such a cyst is difficult. Its consistence, progressive development, and the absence of pain may lead to its confusion with lipoma, fibroma, and even osteoma (Alleman's case). These cysts, he asserts, are found more often on the outer side, only 15 authentic observations of their occurrence on the inner wall being recorded.

E. L. Cocks⁷⁰⁰ *Jan.* reports a case of *gummatous tumor of the right orbit*, with prominence of the globe, anaesthesia of the cornea, and dilatation of the pupil. There was atrophy of the corresponding optic nerve. After six weeks of specific treatment, the eye resumed its normal position, but no improvement in vision occurred.

A case of *metastatic abscess and cellulitis of the orbit*, following suppurating chancroidal buboes of the inguinal region is reported by Würdemann.²⁷ When the patient was first seen, there was iridocyclitis, which was soon followed by panophthalmitis and protrusion of the ball. An exploratory incision being made through the conjunctiva to the apex of the orbit two days later, pus exuded. Enucleation was performed and a large retrobulbar abscess in the capsule of Tenon evacuated. Rapid recovery, with a very shallow socket, followed. Badal²⁷⁴ reports the removal of a *pediculated tumor from the orbit* of a woman of 70 years, with preservation of the eye. The tumor was removed in two portions, the deeper being attached by a delicate pedicle to the apex of the orbit, and presenting the peculiar appearance of a fibrous sac containing liquid, in which a firm, central, oblong mass of new formation was suspended. The tumor was pronounced a fibro-sarcoma. The author considers the case unique. Reeve²⁹ records the removal of a pigmented, mixed, round and spindle-celled *sarcoma of the orbit* of a man, aged 63 years, whose eye had been enucleated fifteen years previously for a melanotic tumor of the choroid. He does not consider the second growth recurrent on account of the long interval, but suggests the possibility of irritation from an artificial eye worn constantly for that length of time. Webster²⁷ removed a round-celled sarcoma from the orbit of a young man. The operation was done three months after the removal of an "hypertrophied lachrymal gland," and was followed in six weeks by a recurrence. At the time of the patient's death, nine months later, the growth protruded from the orbit and measured 22 inches in circumference.

DISEASES OF THE LACHRYMAL APPARATUS.

Trousseau¹⁷³ reports a curious case of *hypersecretion from one of the lachrymal glands* excited at irregular intervals by emotion, bright light, wind, or dust. During a period varying from five minutes to several hours, the gland could be felt to slowly increase in size, until finally it would suddenly discharge its contents. The patient was a lady of 42, somewhat nervous, but otherwise in good health. Terson¹⁰⁰ believes that a number of cases of *simple epiphora* depend almost exclusively upon a lesion of the lachrymal gland, a condition which it is important to recognize at the beginning. In such cases he advocates ablation of the palpebral portion

of the gland as offering a simple operation and, at the same time, destroying the activity of the orbital gland, whose excretory ducts traverse the smaller palpebral portion.

In addition to his series of 28 cases of *ablation of the palpebral portion of the lachrymal gland* for the relief of excessive lachrymation, reported last year (see ANNUAL, 1891), Chibret⁷⁸ now publishes 14 new cases, giving the technique of the operation. Nine cases treated by simple excision furnished 4 complete successes and 5 partial successes, with a mean persistence of one-fourth of the previous lachrymation. In 4 other cases, in which the reduction of secretion was not sufficient, he employed the thermo-cautery to remove portions of the gland presumably left behind, doing this within a few days after the operation. Three of these cases were successful; the fourth was a failure. In the remaining case, in which he attempted entire removal by the cautery, the result was bad and the operation more painful than excision, to which he subsequently resorted with success.

Foster²⁴⁹ removed a *cystic tumor of the lachrymal gland* from a woman 45 years of age. The growth was composed of three cysts encircling the gland. Five months after the operation the fluid had re-collected in large quantities, necessitating its removal. At the time of the last observation there was a reasonable supply of tears and the patient complained of epiphora upon exposure. Du Bois-Reymond³⁵³ records a case of *sarcoma of the lachrymal gland* which had been painlessly growing for nineteen months in the orbit of a woman 64 years old. It was associated with left-sided goitre and right-sided exophthalmos. There was diplopia and restricted movement of the corresponding eye, vision being impaired by a myopic astigmatism caused by pressure. After removal of the globe the exophthalmos and diplopia disappeared and vision improved. Seeligsohn³⁵⁸ has reported 2 cases of *dacryoadenitis* in men, both of whom, a short time previously, had had gonorrhœa, although gonococci were no longer found in the urethral secretion. In one case the attack set in acutely; in the other, it was subacute, but attended with two exacerbations in which acute œdema of the eyelids developed. Dacryoadenitis, he believes, is a rare affection, and is, in most instances, secondary to adjacent inflammation. In the 2 cases reported, the author is uncertain of the etiology, but suggests a possible metastasis from the urethral disease. Bock⁸⁴,

reports a case of *tubercular tumor of the lachrymal sac* which seems to point clearly to a directly infectious origin. The patient had tuberculosis of the right elbow-joint, with suppuration, and the author thinks that infectious material was carried on the fingers of the left hand to the eye.

The rarity of *tuberculosis of the conjunctiva and lachrymal sac*, although these membranes are markedly exposed to infection, is attributed by Fick²¹⁴ partly to the chemical action of the tears and partly to the mechanical washing away of the bacilli. It is only when the passage to the nose is obstructed that there is likelihood of a mycotic disease of the sac, the so-called *dacryocystoblennorrhœa*. He believes, further, that the bacillus tuberculosis does not thrive among staphylococci and other bacteria.

Parinaud¹⁷¹ describes, under the name of "*lachrymal pericystitis*," the accidents, acute or chronic, which develop around the lachrymal sac under the influence of a stenosis of the nasal canal. He holds that such conditions are very common, and correspond to the anchylops of the ancients, who, if they did not appreciate the cause of such a condition, were, at least, more nearly right than modern authors who confound an abscess in front of the sac with an inflamed lachrymal tumor. If a pericystitis is seen in the first two or three days, before suppuration be established, he asserts that he is able to abort it by a single catheterization, and thus to cure many cases of supposed erysipelas. If suppuration is established, he advocates early incision as the best means of preventing a lachrymal fistula.

In the *treatment of lachrymal obstruction*, Libbrecht¹⁷³ slits the lower canaliculus with a bistoury or scissors only to a distance of five millimetres from the punctum, and passes Bowman's sounds for eight days following. He then introduces his triple-furrowed sound, which is allowed to remain in place during the rest of the treatment, permitting the instillation of a 1-per-cent. solution of zinc chloride to be made along its capillary furrows. In rebellious cases, nitrate of silver or Canquoin's paste is cautiously used. After the cure is effected the lips of the wound are freshened with a silver stick and brought together by a catgut suture, thus restoring the function of the canal and the punctum. Ivins⁷⁷⁶ is convinced that the plan of probing the lachrymal canal is superior to the older method of slitting the canaliculus. He finds the treatment

easier and the results better where the upper canal is selected. French⁷⁷⁶ practices probing without previous slitting of the ducts, following this by injections of hydrastin, liquid nitrate of mercury, or nitrate of silver.

In *washing out the lachrymal passages*, Vignes¹⁷³ employs a hollow, conical cannula, which has its lower opening upon the side and a short distance above the terminal point. By its use he avoids preliminary slitting up of the canaliculus. Randolph⁷⁸⁴ believes that in the *treatment of "necrosis of the lachrymal sac* the canal should be dilated to its utmost anatomical capacity." Lagrange⁷⁰ makes the following summary of methods of *treatment of affections of the lachrymal apparatus*: 1. *Epiphora*: astringent and antiseptic collyria. 2. *Catarrh, with and without stricture*: in the first case, catheterism by Bowman's probes, followed by injections of sublimate, 1 to 3000; in the second, the injections will suffice. Finally, extirpation of one or both parts of the lachrymal gland. 3. *Suppuration of the sac*: if acute, incision of the anterior wall, bichloride wash, and iodoform dressing; if chronic, treatment for blennorrhœa; and if this fails, as it usually will, incision of the sac and cauterization of the mucous membrane with actual cautery. 4. *Lachrymal fistula and fungosities of sac*: thorough destruction, by thermo-cautery, of the sac and its surrounding tissue. 5. *Alterations of the bony walls*: opening, scraping, curetting, and cauterization. Specific treatment, if required.

In the treatment of catarrhal lachrymal obstructions with epiphora, Terson¹⁷³ advises ablation of the palpebral portion of the lachrymal gland, if the symptoms persist after the ordinary treatment has secured a permeability of the lachrymal passages. In exceptional cases the orbital portion of the gland also requires removal. If disease of the bony canal renders the cure of the catarrh almost impossible, he proceeds to destroy the sac, reserving ablation of the glands for a last resort. On the other hand, Despagne¹⁷³ states that an altered mucous membrane is the sole cause of epiphora in this condition, and he regards ablation of the gland as irrational treatment, asserting that when the symptoms do not yield to catheterism and astringent injections, a cure may be effected by curetting and antiseptic washings of the mucous membrane of the sac. The same operation is recommended in lachrymal abscess.

When excessive dilatation co-exists, he excises a portion of the wall of the sac. Four cases of chronic dacryocystitis successfully treated by cauterization of the sac are reported by Gorand.⁷⁸⁰ The same author⁷⁸¹ records two cases of *chronic epiphora with purulent catarrh of the sac* cured by extirpation of the orbital lachrymal gland. He prefers to make an incision directly through the eyelid, instead of enlarging the palpebral opening by incising the external canthus, as in Velpau's operation.

Foucher¹²² has analyzed 183 cases of *dacryocystitis*, and reaches the following curious conclusions as to etiology. Dacryocystitis is a frequent affection, and is of gravity because of the dangers to which it exposes the cornea. It occurs upon the left side more frequently than upon the right, and affects women oftener than men; appearing on the average toward the thirty-third year of age, and about six years after the beginning of epiphora. The predisposing cause is a depraved constitutional state, which is evidenced by a mortality of nearly 46 per cent. among the children or the brothers and sisters of these patients. Variola has been found to have occurred previously in 41 per cent., and thus seems to favor the appearance of the disease. Nasal affections—hypertrophic and atrophic rhinitis, deviation of the septum, and especially fetid atrophic rhinitis—seem intimately associated with dacryocystitis. The bad condition of the teeth in many cases renders possible the propagation of periosteal inflammation from the jaw to the lachrymal mucous membrane. The number of subjects of this disease who show Hutchinson's teeth, the excessive mortality noted in certain cases, and the proportion of 8 per cent. of acknowledged syphilitic disease, show the frequent action of syphilis in this affection. Purulent ophthalmia, as well as heredity, direct traumatism, and osseous lesions, contribute to the causes of dacryocystitis. Fano²⁵⁸ maintains that acute dacryocystitis is, in reality, a suppurative osteo-periostitis of the orbital process of the superior maxilla, and only secondarily implicates the sac. A resulting fistula he treats with very satisfactory results by means of deep injections of a few drops of the liquor de Villate [solution of the subacetate of lead, 12 grammes (3 drachms); sulphate of zinc and sulphate of copper, each 6 grammes ($1\frac{1}{2}$ drachms); white vinegar, 80 grammes (2 $\frac{1}{2}$ ounces)].

In the treatment of chronic catarrhal or bleunorrhœal dacry-

cystitis, after ordinary methods have failed, or in case of the formation of an ectasia of the walls from impenetrable stricture, or in case of fistula, Silex¹⁶⁶ recommends the extirpation of the sac. He especially advises this if there be a purulent keratitis.

DISEASES OF THE EXTRA-OCULAR MUSCLES.

In an examination of 120 persons, in reference to the *latent position of the eyes in distant fixation*, Berry²⁰³⁶ found that in emmetropia a large proportion had either perfect, or nearly perfect, parallelism; in myopia, perfect parallelism was less frequent, and the degree of latent divergence or convergence was higher; in hypermetropia, also, parallelism was less frequent than in emmetropia, and latent convergence was more frequent and more considerable than latent divergence. From the examination of even this limited number of cases, he believes it to be evident that in emmetropia, and still more strikingly in ametropia, there is no necessarily intimate relation between accommodation and convergence.

Stevens²⁴⁹ states that "the condition of *antipathy to single vision*, as described by Graefe and by subsequent authors, depends not upon lesion of the brain or faulty projection of the images from the retina, but upon unequalled tension of corresponding ocular muscles under the influence of corresponding nerve-impulses directed to them." As a second causative influence, which acts as an element in nearly all of these cases, he recognizes the difference in the relative tension of muscles which act in the vertical direction. To overcome this incompatibility to single vision, the author considers it necessary, after first correcting the unequal tendency in the vertical direction, in most instances, to bring the insertion of the disabled muscle forward, and to reduce the tension of the corresponding one of the other eye.

In considering the *etiology of convergent strabismus*, Parinaud¹⁷¹ believes that there is a special innervation of the ocular muscles for convergence, the interrelation between convergence and accommodation being established by its intermediation. He adds that the change necessary in this interrelation in ametropes, in order that binocular vision may be possible without correction of the ametropia, is a cerebral act. He later¹⁷¹ considers at length the various etiological influences concerned in the production of

this defect. Hess²⁰⁴ denies the existence of *unequal accommodation* of the eyes, as claimed by Schneller, in his publication on the theory of strabismus. After a series of experiments, Greeff²⁵⁴ denies the possibility of unequal accommodation in the two eyes, believing that the clinical facts which seem to point to this can be explained without having recourse to such a supposition.

Bourgeois¹⁷³ records an unusual case of *traumatic rupture of the inferior rectus*, which he saw three weeks after the accident. The torn anterior extremity of the muscle, embracing about one-third of its entire length, was visible, as a fleshy swelling, at the

FIG. 1.

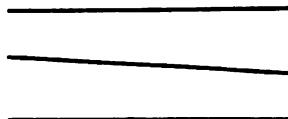


FIG. 2.

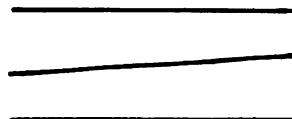


FIG. 3.

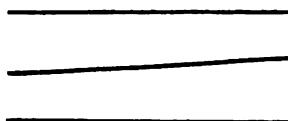


FIG. 4.

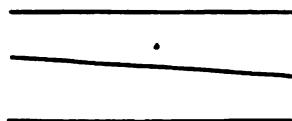
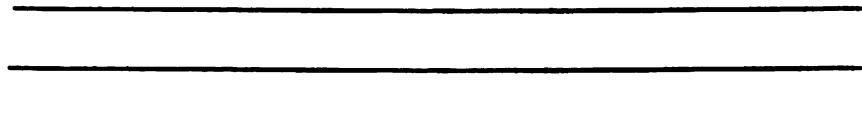


FIG. 5.



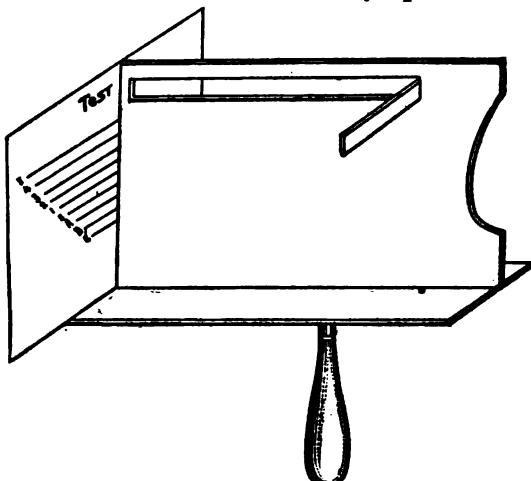
SCHEME FOR THE DETECTION OF INSUFFICIENCY OF THE OBLIQUE MUSCLES. (SAVAGE.)
(*Archives of Ophthalmology.*)

point of tendinous insertion. The patient refused operation for several weeks longer. Because of a partial ptosis, due to excessive length of the upper lids, the author performed tenotomy of the corresponding superior rectus, with marked benefit.

Savage²⁴⁹ believes that there are cases of eye-strain due to *insufficiency of the oblique muscles*. To detect the presence of this condition, the author places a double prism, with the axis vertical, before one eye, the other eye being, for the moment, covered, and has the patient view a horizontal line on a card held at eighteen inches' distance. The effect of the prism will be to cause the appearance of two parallel lines. The opposite eye is now uncov-

ered, and a third line is seen between the other two. The determination of the balance of the oblique muscles depends upon the relative position of this middle line. If equilibrium exists it will be parallel with the other two, but if a want of harmony exists the parallelism will be disturbed. Fig. 1 shows the position of the line when there is insufficiency of the superior oblique in the left eye. Fig. 2 exhibits insufficiency of the inferior oblique of the same eye. Fig. 3 shows insufficiency of the right superior oblique, and Fig. 4 insufficiency of the right inferior oblique. The author states that this condition of the oblique muscles brings on, at a longer or shorter interval, a train of nervous symptoms, for which, at the present time, he can see no hope of prevention or cure.

Gradle¹¹⁵ has devised a method for determining the presence of latent squint and insufficiencies of the ocular muscles based upon the exclusion of binocular vision, so as to allow the muscles to contract and adjust their tension according to their relative strength, while a given object is viewed without the possibility of seeing that object double. This is accomplished by the employment of an ingenious apparatus, as is shown in the figure. By adjustment it can be made to subserve the purpose of determining both horizontal and vertical deviations. Landolt, corresponding editor at Paris, France, ²⁷⁴ _{Nov.-Dec., '90} maintains the existence of *muscular asthenopia*, which, he says, was denied by several speakers at the late Congress of Berlin. He quotes a number of cases of this trouble, in which he secured successful results from advancement, usually of one, more rarely of both, of the internal recti. As a result of the clinical study of a series of cases of *hyperphoria*, Hansell⁵ _{Apr.} concludes that "hyperphoria is a real affection, and that, while it may exist



GRADLE'S INSTRUMENT FOR DETERMINING LATENT SQUINT
AND INSUFFICIENCIES OF THE OCULAR MUSCLES.
(*Western Medical Reporter.*)

without causing symptoms, it is in some cases of the highest importance: that it may produce reflex disturbances in an oversensitive or exhausted system; that reflex functional disorders are found, in patients with hyperphoria, which are not caused by hyperphoria; that it is not dependent upon errors of refraction; that it should be sought for in every case of asthenopia; that the degree can be determined only after repeated examination; that tenotomy, and not prisms, is the treatment for hyperphoria; and that in most cases the tendon should be completely divided." Angell⁷⁶ gives the notes of several cases of *heterophoria*, relieved by wearing glasses correcting the associated refraction error. The author says that "it would appear that heterophoria, even in neurotic individuals, often yields to the correction of the error of refraction." He is inclined to the belief that "in heterophoria a careful search will usually show a refractive error—often nothing more, perhaps, than a slight astigmatism." Speaking of the use of *prismatic combinations* in cases of *slight defects of muscle balance*, Percival² states that in hyperphoria the whole error should be corrected, as it would rarely be found that prisms of more than 2 dioptres are required for the purpose. In esophoria and exophoria he distinguishes between that class of cases in which the amplitude of convergence is impaired and that in which it is not impaired.

In cases of hyperphoria of more than three degrees, Amy S. Barton²⁰³⁹ prefers dividing the operation between the two eyes, and says that in very high grades it may be necessary to operate more than once on each eye. Her experience leads her to believe that "the tendon needs to be more thoroughly divided in many cases than was taught by Stevens," the division in any case being graduated by the amount of insufficiency to overcome. Webster¹ believes that "it is a mistake to deny that any good can come of an optical tenotomy," and that "it is an equally grave mistake to claim that all the ills that flesh is heir to are to be cured by cutting the muscles of the eye." He adds that the patients to be operated upon should be judiciously selected, and the operation should be resorted to only after other means have failed. From a record of his own cases, J. S. Stewart⁹ judges that "fully 75 per cent. of the strabismus occurring in the young can be overcome by careful measurement and correction of the refractive error." Roberts, of Buenos Ayres,²⁷⁴ makes a valuable contribution to

our knowledge of the *topographical anatomy of the external angle of the eye in its relation to the operation of strabotomy*. Tanguinan,⁵³ says that in convergent strabismus "a tenotomy is permissible only after a refractive condition of the eyes has received the most careful consideration, and glasses have been worn for a year or more." Murrell⁵⁰⁶ considers that "the *operation for strabismus* is not a simple operation, but is fraught with many difficulties, and the result is not always perfect, cosmetically considered, but only approximately so; while, in a large majority of instances, the result of the operation would be, optically considered, a total failure."

French⁷⁶ believes that "there are three *mistakes* into which we are likely to fall in the *treatment of muscular anomalies*: - one is too great a dependence upon the exercise of the muscles for correction of faults of decided character; the worse one of indiscriminate cutting for all grades of deviation; and the delusion of trusting to the separation of a few of the central fibres of the stronger muscles in decided deviation."

A. F. Baker⁷⁶⁰ states that in the *treatment of squint* he is usually governed by the following rules: "1. If the squint is alternating, and the vision fairly equal in both eyes, it is seldom necessary to operate. A full correction of the ametropia will usually result in cure of the squint. 2. If the squint is fixed in one eye, but the vision of the squinting eye good, the same rule should be observed, excepting that atropia should be instilled into the working eye occasionally, and, possibly, a patch kept over it, and orthopedic exercise indulged in as described by Landolt. 3. If the squint be fixed in one eye, and the sight very defective, and no improvement after patient trial with lenses and covering good eye, only a cosmetic result can be obtained. The operation should be performed any time after the sixth year. 4. If the squint be fixed in one eye, and the vision of this eye be slightly defective, it is possibly undergoing deterioration from disuse, and should be carefully exercised, watched, and tested; if the deterioration of vision appears to be increasing, an operation should be performed at once."

Juler,² considers that no case of permanent squint is too young for operation, as the visual axis should be put straight in order to give the patient the chance of educating the squinting

eye. He does not believe age to be a contra-indication, as the fear of diplopia had not been realized in his cases. He is in the habit of combining advancement of the antagonist of a muscle in all cases where there is amblyopia in one eye. Toswill ²_{Sept. 12} says that in internal squint he never does more than one tendon at a time. Wray ²_{Sept. 12} believes that the treatment of squint in infants should consist in covering the good eye for a stated number of hours daily, not with the object of prevention or overcoming amblyopia, but with a view of establishing the normal innervation of the external rectus. MacKinlay ²_{Sept. 12} says that he does not operate before 3½ or 4 years of age, because he attaches very great importance to following the operation, in the majority of cases, by the wearing of glasses. McHardy ²_{Sept. 12} thinks that the rule should be not to operate before 6 years of age. He says that "a muscle too weak must be strengthened by advancement; if the squint, as usual, depends upon excessive power of a muscle, this requires section." Percival ²_{Sept. 12} states that in cases of muscular weakness orthoptic exercises are to be recommended.

Robertson ²_{Aug. 22} gives the following description of a modification of the ordinary *operation for advancement of the tendon of a rectus muscle*. After the patient has been etherized, supposing the case to be one of divergent strabismus, the tendon of the internal rectus is exposed and caught in Prince's strabismus-forceps, and then the tendon of the external rectus is divided subconjunctivally. The internal rectus is now severed close to the sclerotic insertion, and cleared, for some distance, of its attachments to the conjunctiva and ocular capsule. One of the needles, attached to a double-armed, waxed-silk suture, is now threaded in and out through the base of the tendon, which is pulled forward by Prince's forceps. The respective needles are now passed in and out, under and over the conjunctiva, close to the upper and lower margins of the cornea, until a point well beyond the outer margin of the cornea is reached. A small piece of the extremity of the internal-rectus tendon (varying in amount according to the effect desired) is then snipped off, and the ends of the ligature tightened and tied after the cornea has been well directed inward. The edges of the conjunctival incision are brought together by suture, and both eyes bandaged. The advantages claimed by the author for the operation are: (1) the cornea is more firmly and efficiently directed inward by the ligature; (2) the

ligature is easily removed ; (3) the tendon of the muscle is held in the loop of the ligature, and thus may naturally lie in its ordinary plane. In the *operation for capsular advancement*, Kalt¹⁷³ says that success depends upon complete denudation at the sclero-corneal margin, free dissection of the capsule, and, finally, upon a skillful estimation of the degree of the resistance or the rigidity of the capsule. Fernández¹⁷¹ records the *spontaneous disappearance*, after eight years' existence, of an *exophthalmos consequent upon a tenotomy of the internal rectus*.

Dransart¹⁷³ gives the result of his observations on the *nystagmus* of miners in the north of France. The affection exists in two forms,—one slight, the other grave. In both varieties the oscillation is only produced in looking directly or obliquely upward ; it ceases when the patient looks downward. The mild form causes no functional trouble, and does not prevent work ; it must be sought for at the time the subject emerges from the mine, for after a certain lapse of time it disappears. The grave form is accompanied by functional disturbances, the most important of which are paresis of accommodation, dancing of objects, headache, vertigo, diplopia, difficulty in walking in the galleries, hemeralopia, amblyopia, peculiar attitude, lachrymation, and photopsia. It renders work difficult, and often impossible. In 179 cases of the grave form the subjects were about equally divided between those using the safety-lamp and those using the naked flame. The author considers the affection a neuromyopathy, analogous to scriveners' palsy and lumbago. The principal causative factors he believes to be the upward and oblique regard and poor illumination. W. M. Jones², gives the following reasons for his belief that miners' nystagmus is due to faulty illumination : “1. Less than half of the men who work down in the pit are colliers (these are the only men who use the lying-down position), but the disease is common to all the underground men. 2. It is especially common to men who work in headings, who do very little ‘holing.’ As a rule, the air in headings is very impure, the work is very hard, and the men have to concentrate their eyes on their work. 3. It is very liable to come on in men who have previously worked with naked lights. 4. It is very much more common in the winter than in the summer. 5. The disease is not confined to the oblique muscles. It is as often met with in the recti.”

In an article on miners' nystagmus among the South Wales colliers, J. Tatham Thompson²⁰³⁶ submits what he considers a reasonable amount of evidence to show "that visual strain, with insufficient illumination, is, at any rate, as great a factor in the causation as strain of the ocular muscles, that the disease is by no means confined to those whose work is done whilst lying down, and that errors of refraction, especially hypermetropia and hypermetropic astigmatism, are predisposing causes." McCarthy² states that if, in cases of slight or doubtful nystagmus in miners, the patient is made to bend his head low for a few moments, without flexing his knees, the affection will exhibit itself in a very marked degree. He says that this test seems to have a distinct bearing on the position theory of causation.

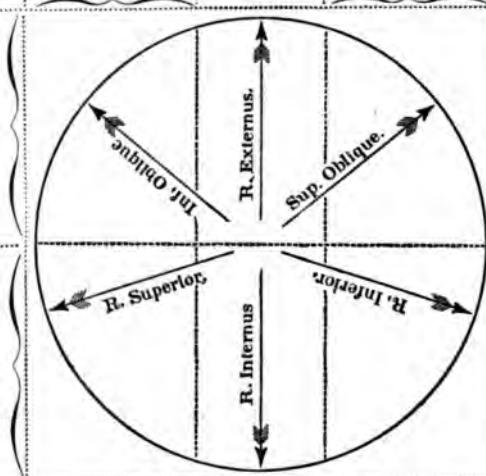
Snell² concludes that he has brought forward sufficient evidence to show that not only is miners' nystagmus met with in the workers with naked lights, and that by no means infrequently, but, further than this, instances have been given of its occurrence in men, not practical miners, pursuing their work in a good light; that it is impossible to regard, therefore, the use of safety-lamps as a sole or even essential element in causation, and that even imperfect illumination may be absent. On the other hand, the evidence given as to the men seen at work in the pits, the analysis and consideration of the cases, supported, as it is, by the views of Dransart, Neiden, and Ziemiński, point to the position assumed at work as the prime element in causation. Smith²⁰³⁹ has seen a case of nystagmus in a miner which is interesting from the fact that the oscillations commenced at any time in bright light, when the patient put himself in the working position; and also from the fact that when last at work sight disappeared when he assumed the kneeling posture, and was regained when he arose to his feet. Snell²⁰³⁶ has observed a case of *vertical nystagmus in a compositor* who, when looking up at the manuscript, was in the habit of turning his eyes "upward, but did not, at the same time, raise his head," thus unduly working the elevators of the eyeballs and upper lids. A cure was effected by the patient adopting the habit of elevating the head at the same time that he directed his eye up to the manuscript. Hoor⁸ records 2 cases of *acquired nystagmus*,—one in an infant, 9 months old, that had formed the habit of fixing its eyes upon a toy over its head; the other in a man

who, for years, had spent a half-hour or hour daily before the mirror, pulling gray hairs out of his head. In both cases, the nystagmus ceased when the exciting cause was removed.

Proskauer¹⁰⁰ reports a case of *congenital ptosis*, in which the paralyzed lid was raised and lowered whenever the mouth was opened and shut, and whenever there were lateral motions of the lower jaw to the right. Motions to the left, however, did not cause the phenomena. Bloch¹⁰⁰ reports 3 cases of *paralysis of the abducens*, observed in healthy children. In each case there was a history of extremely difficult delivery at birth, and objective evidence of injuries to the head caused by the forceps. The author believes that the paralysis was due either to traumatism of the muscles, or, as the intra-ocular conditions in 1 case seemed to indicate, to injury of the sixth nerve, either in the orbit or at its central origin. From his experience in the treatment of several cases of *oculo-motor paresis following influenza*, extending over a period of a year and a half, Fukala⁵⁷ concludes that the duration is just as long as after diphtheria, scarlatina, and typhus, and that the prognosis is very unfavorable. From the abundant data furnished by Schöler's eye-clinic, in Berlin, Liebrecht⁸⁴ makes careful study of the *etiology and prognosis of paralyses of the ocular muscles*. In 25,000 patients treated between 1885 and 1890, there were 312 cases of paralysis of the muscles, not including uncomplicated paralysis of accommodation after diphtheria. Of these 312 cases, 90, or 29 per cent., were caused by tabes; 43, or 14 per cent., by brain-syphilis; and 114, or 36 per cent., from unassignable causes. The remaining 65 cases, or 21 per cent., were from a number of causes,—paralysis, diphtheria, meningitis, influenza, rheumatism, and other diseases. Thus it will be seen that in 64 per cent. the etiology was established, and in 36 per cent. it was not. The author believes that every case of apparently idiopathic paralysis of ocular muscles has its cause in diseased conditions of the body, which may not be detected for years subsequently.

The following *diagrammatic scheme* is given by Guende¹⁷³, as a convenient and simple device for correlating the symptoms of paralyses of the extra-ocular muscles.

Dehenne²⁴ records a case of complete *ophthalmoplegia* (excepting the levator palpebræ superioris), which is of interest from its

DIAGRAM FOR THE IMAGES HOMONYMOUS.		DIAGNOSIS OF PARALYSES OF THE EXTRA-OCULAR MUSCLES.	DIPLOPIA IN THE SUPERIOR VISUAL FIELD. The <i>higher</i> image is that seen by the PARALYZED eye.	DIPLOPIA IN THE INFERIOR VISUAL FIELD. The <i>lower</i> image is that seen by the PARALYZED eye.
ADDUCTORS.	ABDUCTORS.	<p>The separation of images increases on the side of the <i>unaffected</i> eye.</p> 	<p>DIPLOPIA IN THE SUPERIOR VISUAL FIELD. The <i>higher</i> image is that seen by the PARALYZED eye.</p>	<p>DIPLOPIA IN THE INFERIOR VISUAL FIELD. The <i>lower</i> image is that seen by the PARALYZED eye.</p>

GUENDE'S DIAGRAM FOR THE DIAGNOSIS OF PARALYSES OF THE EXTRA-OCULAR MUSCLES.
(Recueil d'Ophtalmologie.)

obscure etiology and the rapidity and completeness of its cure. At first considered to be a syphilitic paralysis, although all antecedent history and symptoms were wanting, it was treated energetically with mercurials, but without amelioration. This fact, added to the appearance of optic neuritis and pain when the globe was pressed backward into the orbit, suggested the possibility of a rheumatic tenonitis with effusion. Puncture of the capsule and antirheumatic treatment effected a complete cure in two weeks. Recken ³⁵⁸ _{oak} reports 2 cases of bilateral exterior ophthalmoplegia occurring in children, the one in a girl, following an attack of "catarrh," at the age of 4 years; the other in a boy of 7, dating from birth. He proposes a remodelling of Mauthner's classification of ophthalmoplegias by dividing them broadly into 2 classes, which are characterized, the first by the absence of atrophy and reaction of degeneration, the second by the presence of these changes. Salzmann ⁵⁷ _{May} reports a case of unilateral so-called complete oculo-motor paralysis in a patient 22 years old. The condition had existed since a severe illness at the age of 2 years, described as "sore throat." The case was interesting from the fact that the levator palpebræ and the sphincter pupillæ were in a state of constant, involuntary rhythmical contraction and relaxation. Gutmann ⁴¹ _{Dec. 18, '90} reports a case of bilateral exterior ophthalmoplegia caused by ptomaine poisoning from the eating of putrid meat. The pupils reacted to light, and accommodation was unimpaired.

An interesting case of *temporary parageusia with ophthalmoplegia* is reported by Wherry. ²⁰³⁶ _{v.ii} The patient, a man 47 years of age, upon first presenting himself had homonymous diplopia, worse in the right field. One week later this was followed by marked divergence, with crossed diplopia. There was no weakness of a single muscle, but convergence was impossible. The pupils were dilated, but accommodation was intact. In a case of right oculo-motor palsy, Straub ²⁵⁴ _{Jan.} noted a *paralysis of convergence* persisting after the former condition had been cured. Convergence for any distance short of two metres was impossible; but the reactions of the pupils to light and accommodation were normal. The author supposes that there was a central lesion, and thinks that this case shows that the synergic contraction of the sphincter iridis belongs to accommodation and not to convergence.

C. K. Mills ²⁰⁴⁸ _{v.ii} reports a case of *left unilateral ophthalmoplegia*.

Excepting the levator palpebræ, which was much weakened, the paralysis was complete. The edges of the disc were somewhat hazy, but vision was "good." The fellow-eye was normal. The left ear was deaf and there was loss of the sensations of pain, touch, and temperature over the whole of the face and forehead to the left of the median line, as far as the outer angle of the orbit. The left conjunctiva and the left side of the tongue and mouth were also anaesthetic. The patient complained of pain around and at the back of the left eye. One week later the eye was found to be entirely blind. Under the use of potassium iodide and mercurial inunctions, the pain and tenderness disappeared and the anaesthesia diminished, but all the other eye-symptoms persisted. The author suggests that the probable cause of this condition was thrombosis of the cavernous sinus associated with basic meningitis. Würdemann⁶¹ has seen a most instructive case of fibro-sarcoma of the neck, with *temporary ophthalmoplegia externa* and sympathetic paralysis, in a boy 14 years of age.

DISEASES OF THE LIDS.

Fraenkel³⁵³ reports the case of a girl of 5 years of age, under observation for a year and a half, in whom the *left upper lid was forcibly raised* whenever, *during mastication*, she looked downward or opened her mouth widely. Two instances of *eccentricity in the growth of an eyelash* have been seen by F. M. Chisolm.³⁴⁷ In each case the eyelash, as it was about to emerge from the free border of the lid, had had its point caught under the epithelial lining of the hair-follicle, and thus, twisted upon itself, had continued growing upward, tunneling a passage under the skin until the full growth of the hair had been reached. Lincoln¹¹² has seen 2 cases of *phthirusiasis palpebrarum*. In both instances the parasite was found upon the upper lids. Schwenk⁷⁰⁰ reports several cases of pediculi pubis in the eyelashes, eyebrows, and head, and gives a most interesting account of the appearances and habits of the parasite. Badal¹⁸⁸ records another case of *chancre of the margin of the eyelid*, this instance occurring in an adult female. James²⁰³⁶ has observed a *vaccination pustule* on the right upper lid of a boy 9 years old, who had been near an infant that had been recently vaccinated. The patient had three well-marked old vaccination scars on the left arm. *Epithelioma of the inner angle*

of the lids is considered by Valude²⁷⁴ as presenting a much more serious prognosis than that in other parts of the lids, because of the ease with which the neoplasm can extend to the orbital and nasal cavities. The important point in the operation for removal of such a growth, according to the author, is to refrain from closing the wound by primary restoration with flap or otherwise, and to leave this step for future operation. By this means recurrent growths may be more readily removed and a smaller surface for repair will be left after partial healing. Silcock²⁰³⁸ reports the case of a 73-year-old man, in whom an ulcerating and thickened edge of the upper lid, resulting from the formation and ulceration of Meibomian cysts, simulated epithelioma. Sheldon⁷⁷⁴ reports the removal of a hard elastic cyst containing a piece of glass one-quarter inch square and one-sixteenth inch in thickness from the edge of the external canthus of the right eye. The patient, who was 36 years of age, remembered being struck in the face by a piece of glass when a boy. Bock¹⁹⁰_{Sept.} reports the formation of an abscess in the region of the rectus superior, which spontaneously discharged itself through the bulbar conjunctiva at the site of the insertion of this muscle. The first symptom was diplopia, then hyperæmia, and chemosis of the conjunctiva, followed by œdema of the lid and pain. It was not until nearly three weeks later that a tumor was observed at the site of the insertion of the rectus superior. Inasmuch as the patient had had frequent styes, the author attributes the causation to an infection carried by the lymphatics from some latent focus of suppuration at the margin of the lids.

In cases of *obstinate blepharospasm*, Allport³⁴⁷ resorts to stretching the fibres of the orbicularis muscle, preferably under an anæsthetic, by placing a strong, short speculum between the lids. After the instrument has been firmly set, it is allowed to remain in position for about five minutes. If necessary, the procedure can be repeated several times at intervals of a few days. Callan⁶¹_{Jan. 24} successfully treats blepharospasm associated with conjunctival or corneal trouble, by introducing a speculum and opening its branches sufficiently to expose the cornea for five or ten minutes to diffuse daylight. He attributes the result not to the stretching, but to the exposure of the sensitive cornea to daylight—"the natural stimulus of the eye." Gillet de Grandmont¹⁷³ describes a new *operation for the relief of congenital ptosis*. Its essential

feature is the removal of a portion of the orbicularis, so as to lay bare the tarsal cartilage, and the excision of a crescent-shaped piece of the latter, so as to shorten the lid by an amount sufficient to correct the deformity. In practicing Dransart's operation for congenital ptosis, Dehenne¹⁷³ employs naphtholated catgut with good success. In the *treatment of paralytic ptosis*, Bagnéris⁵⁷⁷ commends Dransart's operation for its simplicity. If performed with special precautions to avoid suppuration, he thinks this method equally as valuable as the more elaborate plan devised by Panas.

Of the many methods recommended for the *cure of trichiasis, distichiasis, and abnormalities of the lids*, no one of which alone is adapted to every case, Raehlmann⁹⁰, believes, from his experience, that the Jaesche-Arlt and the Snellen methods, alone or in combination, answer for the majority of cases. Where the inner edge of the lid is normal, the Jaesche-Arlt method gives satisfactory results; but where it is gone and the outer edge lies upon the eyeball, with the lashes touching, he obtains the best results by first practicing the Snellen method, and afterward doing the Jaesche-Arlt operation. In the surgical treatment of trichiasis and entropion, MacKlin²³⁵ prefers an operation similar to that advocated by Green, of St. Louis. Guibert¹²⁷ has seen a case of *double entropion of the lower lid* of congenital origin. He agrees with Panas in attributing the anomaly to an absence of the tarsus, and considers it a sign of degeneration. Definitive cure was effected by making a deep incision with the thermo-cautery through all the tissues down to the conjunctiva, in a line parallel with and two millimetres from the ciliary border. In minor degrees of entropion Minney⁷⁸ performs the following operation: After thoroughly cleansing all the parts involved in the procedure with warm boric-acid wash, and applying a piece of absorbent cotton, wet with the same, to the region from which the graft is to be obtained, the lid to be operated upon is everted and "an incision is made corresponding to the inverted cilia, extending from a point 2 to 4 millimetres beyond either side, 2 millimetres in depth, being careful to keep well on the inner border of all the cilia," and separating the mucous membrane from the cartilage. The lid is now returned to its normal position, and covered with absorbent cotton wrung out of hot saturated boric-acid solution. An elliptical-shaped graft, one-third to one-half larger than the prepared incision, and from 1

to 2 millimetres in width, is separated and transferred to the incision, which is made ready by again evertting the lid and removing all clots. The graft is placed in position, cut surface to cut surface, and pressed upon gently until it is even with the surface margin of the lid. The eye is then closed and an antiseptic dressing is applied.

After a large experience with the different methods of skin transplantation for deficiencies of the lids, Silex ⁶⁹ gives preference to the method of Wolff. He reports a case of ectropion of both lids, which had been operated upon by other methods eight times in nine months without success. By transplanting flaps from the upper part of the arm, he succeeded in effecting a cure. Panas ¹⁰ gives the notes of 6 consecutive successful *blepharoplasties*, the flaps being detached and transplanted directly from the skin of the inner side of the arm, or forearm, after the method of Le Fort. A double cicatrical symblepharon, previously operated upon unsuccessfully twelve times, was so completely relieved that the patient was able to retain an artificial eye. In blepharoplastic operations on the lower lid, Santos-Fernandez ⁴⁵⁹ prefers to take a fronto-nasal flap, on account of the rich vascular supply of the skin in this region. Von Schröder and Natanson ²¹ report 5 cases of blepharoplastic operations by Thiersch's method, with most satisfactory results. Wicherkiewicz ⁷⁸ describes a novel and ingenious method of blepharoplasty, to which he resorted after removal of a melanosarcoma of the upper lid of a patient 80 years old. The steps of the operation are made clear by a reference to the accompanying cuts. The tongue-like flap, A, embraces the whole thickness of the lower lid, including a portion of the conjunctiva, which thus becomes the lining membrane of the repaired portion of the upper lid. The result was most satisfactory four months after healing. Lagrange ¹⁷³ records a rare instance of *melanotic sarcoma of the upper lid* following a severe contusion.

DISEASES OF THE CONJUNCTIVA.

Cross ²⁰⁸⁶ has had under observation a case in which *blood dropping from the eye*, or the shedding of bloody tears, has been going on at intervals for a year and a half. The bleeding came from the left eye only, and was encouraged by the stooping attitude. The patient was an anæmic female, 21 years of age, who

had no tendency to other haemorrhages and no definite irregularity in menstruation. Fraenkel³⁵³ reports a case in which a *splinter of wool* was retained in the conjunctival sac unsuspected for two years, giving rise to continual discomfort, lachrymation and excessive secretion. T. Thompson³⁵⁴ reports a case of *emphysema of the conjunctiva following the act of blowing the nose*. The globe was displaced downward and forward. Crepitation could be easily elicited. The patient had had an orbital exos-

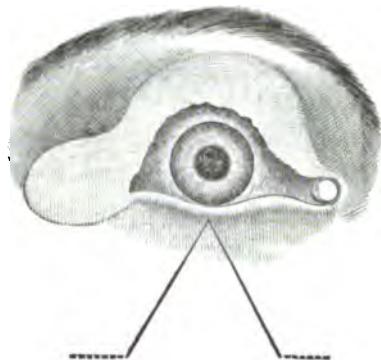


FIG. 1.

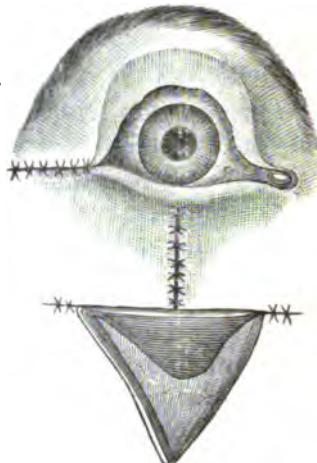


FIG. 2.

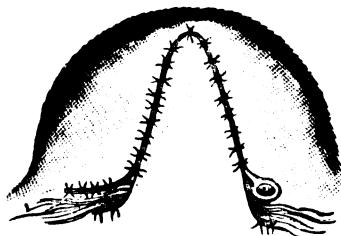


FIG. 3.

WICHERKIEWICZ'S METHOD OF BLEPHAROPLASTY.
(*Revue Générale d'Ophthalmologie*.)

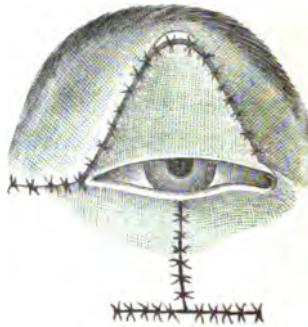


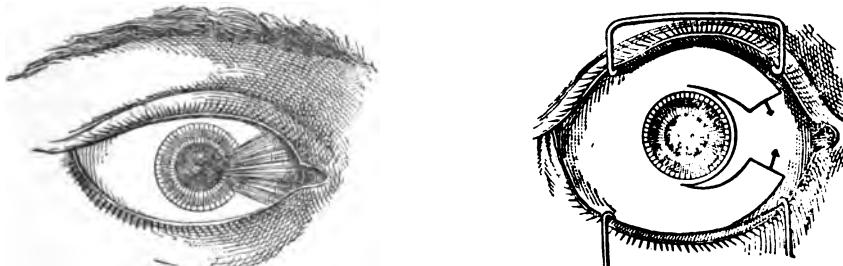
FIG. 4.

tosis removed from the same side ten years previously. A case exhibiting *hyperesthesia of the conjunctiva caused by* instillation of cocaine is reported by Millée.¹⁷³ A case of *chancre of the conjunctiva*, which is very interesting because of the probable mode of infection, is reported by Andrews.²⁰⁴ Three weeks following the attempts of a fellow-workman to dislodge a foreign body from the eye by using the tongue, the sore appeared in

the *cul-de-sac*. Two months later the patient presented secondary symptoms.

From his own experience and that of others, Caudron⁷⁸ states that *gumma of the conjunctiva* is very amenable to appropriate specific treatment. Benoit²⁴³ has observed in his own person the effects of accidental *inoculation of the conjunctival sac with vaccine virus*. The period of incubation was the same as in the case of an ordinary cutaneous vaccination, and at the end of this period three vesicles appeared in the inferior *cul-de-sac*, and, two days later, another upon the ciliary border. This latter followed a regular course of development, marked by intense itching and considerable œdema of the lid, with conjunctival congestion and chemosis and swelling of the preauricular and submaxillary glands. A continuous discharge from the corresponding side of the nose suggested the probability of a pustule on the nasal mucous membrane. The principal interest in the observation, the author thinks, lies in the fact of an inoculation of the mucous membrane of the eye and nose without the existence of abrasion or wound of that membrane.

Hirschberg¹⁹⁰ describes a case of *pterygium of unusual character*, in that its base was attached not to the conjunctiva of the



HIRSCHBERG'S OPERATION FOR PTERYGIUM.
(Centralblatt für Praktische Augenheilkunde.)

ball, but to the nasal third of the conjunctiva of the under and upper lids. Abduction beyond the middle line was impossible, and diplopia of high degree was complained of. The operation, which was followed by disappearance of the double vision and restoration of motion outward, was performed as follows: An incision was made around the cornea, but a short distance from it, the membrane divided by a cut through the middle down to the base, and the attachments to the lids severed. Flaps were then

cut out of the conjunctiva and underlying tissues above and below the denuded region, as shown in the cut, and brought into apposition by six sutures. In the *treatment of pterygium*, Briggs¹⁴⁷ has obtained fairly satisfactory results with "the least possible danger of recurrence," by combining the method adopted by Price with the plan devised by Hobby. Albrand³⁵⁹ ~~May~~ reports that, after a series of *injections of Koch's lymph*, a case of *tuberculosis of the palpebral conjunctiva* was *apparently cured*, but that in a month the disease re-appeared, either because, as he thinks, latent living tubercular tissue, containing active bacilli, remained; or because the tubercular tissue, having necrosed, was not entirely cast off, and the remaining parts contained living germs. The patient being unwilling to submit to further injections, the tubercular formation was excised, and the remaining tubercles cauterized with the galvano-cautery. This operation was followed by an apparent cure. Sattler⁶⁹ ~~Oct. 1~~ distinguishes four *varieties of conjunctival tuberculosis*. In the first, there is extensive ulceration of the tarsal conjunctiva, and the preauricular lymphatic glands are swollen. In the second, nodules, varying in size from a millet-seed to a lentil, develop, principally in the *cul-de-sac*, and show little disposition to break down. In the third variety, the lid is enlarged and thickened, the conjunctiva is reddened, and, at the *cul-de-sac*, is covered with capillary proliferations; the preauricular glands are enlarged. The fourth form is *lupus* of the conjunctiva. Cases belonging to the first and second groups were treated with tuberculin with some success, but in conjunctival *lupus* no noteworthy effect was produced. From the result of his experiments with the bacillus described by Reymond, Kurschbert, Neisser, and Leber as the cause of *xerosis conjunctivæ*, Cirincione⁵⁸⁹ ~~Nov. 20~~ comes to the same conclusion as Fränkel and Franke, that this organism possesses no pathogenic power over the conjunctival mucous membrane.

Dianoux¹²⁷ ~~Mar. 15~~ describes a hitherto unrecognized variety of conjunctivitis, which he has designated "*conjunctivite à chalazion*." This affection may be acute or chronic, but most frequently is of the latter type, developing very insidiously. The subjective symptoms are those of ordinary conjunctivitis, but there is little or no secretion in the morning, and often the lashes are not agglutinated. On everting the lids, the tarsal conjunctiva and that of the anterior portions of the *cul-de-sacs* show roughening and thickening, the

epithelium, more particularly, being hypertrophied, while the posterior portion of the *cul-de-sacs* and the bulbar conjunctiva remain healthy. In young subjects the external angle frequently shows engorged follicles. After a period of several months without further modification, a chalazion makes its appearance, and this is succeeded by repeated crops. Relapses are very common, and are much more rapid when the tumor opens spontaneously upon the conjunctival surface, thus infecting previously healthy glands. The acute form of the disease is much rarer, and may appear also in the course of the chronic variety. The symptoms are more aggravated, the discharge more profuse, and the Meibomian glands constantly secrete a grayish mucoid material. The skin of the lids becomes reddened, glistening, and stretched, but the ciliary border remains unaffected. The conjunctiva is red, thickened, vascularized, and velvety in appearance. In a few days pressure along the anterior tarsal margins brings out some drops of puriform liquid from the Meibomian glands, and fibrino-purulent filaments may often be squeezed out on deeper pressure. Retention cysts soon form, but their contents are more fluid than in chronic chalazia, and their seat is not so deep in the tarsus. Resolution is slow, and for many months the tarsus remains thickened, lardaceous, and painful to pressure. Relapses are frequent. This disease usually affects both eyes, but generally in different degrees. In a rarer variety, only one of the eyes is affected for a period of several months; sooner or later, however, the fellow-eye is involved, but usually escapes the most disagreeable consequence—the multiple chalazia. The author believes the disease to be parasitic in nature, and recommends the instillation, twice daily, of a collyrium of nitrate of silver (1 to 2000). When a chalazion develops, it should be opened as soon as possible from the conjunctival surface, and the interior of the sac curetted. Refraction should be studied and proper glasses prescribed. In the acute form, deep scarifications should be made, the infiltrated fluid pressed out, and the conjunctiva laved with a 2- or 3- per-cent. solution of nitrate of silver. Later on in the stage of decline, tincture of iodine may be painted on the skin of the lids. Reeve³⁹ records 2 cases of *conjunctival tumor*. The first was a recurrent growth having the appearance of a minute papilloma, springing from the bulbar conjunctiva and covering the outer part of the cornea, to which it was slightly

attached. Histologically, it showed nothing but epithelial-like cells without fibrous tissue. In the second case the growth sprang from the conjunctiva and outer half of the cornea. Microscopically, it was composed of spherules of hyaline-looking material characteristic of cylindroma.

Schirmer²⁰¹ discusses adenoma of the caruncular region and describes a case observed by him. The glandular structures in the interior of the tumor were so enlarged as to become cystic, while the supporting structure was a vascular connective tissue. As to differential diagnosis, he concludes that, from soft fibroma, adenoma is to be distinguished by its hard consistence and slower growth; also by the fact that there is no tendency to diffuse bleeding, as is often observed in the soft fibrous growths. From papilloma it may be recognized by the wart-like appearance of these growths, and by the fact that they are usually multiple and show great tendency to return after removal; the villous forms of papilloma have a smooth appearance and are, in comparison, soft. Finally, he says that the differential diagnosis between a hard fibroma and an adenoma can only be made by the microscope.

Critchett and Juler²⁰² give the notes of a case of *epithelioma of the cornea and conjunctiva*. The patient stated that, several years previously, he had had a pterygium removed from the left eye, and, after repeated recurrences, nitric acid had been applied to the growth. The tumor resembled a cauliflower excrescence, and was situated over the lower outer two-thirds of the cornea, extending downward into the lower *cul-de-sac*, and outward about a quarter of an inch external to the cornea. Microscopic examination showed the growth to be malignant, there being evidences of marked cellular activity, characterized by various stages of cell-division. A *primary carcinoma of the conjunctiva* has been seen by Bourgeois,²⁰³ in a female aged 48. The growth was bilobed, of the size of a small plum, springing from the semilunar fold and the caruncle of the right eye. The tumor had been first noticed six years before, when it resembled a wart, and was removed by strangulating its base with a thread. A year later it reappeared, and was again removed in the same way, and three subsequent operations for removal were made before the case came into the author's care. The diagnosis was confirmed by microscopical examination. The case is remarkable for the slowness and comparative benignity of

the growth. Rumschewitsch³⁵³ _{Aug} reports the removal of an *alveolar melanotic sarcoma*, about the size of a hemp-seed, from the edge of the *plica semilunaris* of a man aged 39. About three months afterward there appeared a pigmented infiltration of the conjunctiva and under lid in the neighborhood of the external canthus; and, in the course of two months more, a tumor of the size of a pigeon's egg had developed. The patient died soon afterward, of typhus fever. After a review of recently-recorded cases of *sarcoma of the palpebral conjunctiva*, Rumschewitsch³⁵³ _{Aug} adds the notes of a case of angiosarcoma, removed from the lower lid of a young man 24 years old. The histological elements were capillary blood-vessels and cells of various shapes, but no connective tissue except in the pedicle of the tumor. The stroma was formed by the capillaries. Dunn¹ _{Sept. 19} remarks that, while the chief cause of *phlyctenular ophthalmia*, in the vast majority of cases, is *adenoids of the naso-pharynx*, there are cases where these adenoids are absent; and in these he believes that the cause is to be sought in some diseased condition of the nasal mucous membrane. In the treatment of this affection in children, the first thing to be done is to remove the adenomatous tissue from the naso-pharynx. Fukala⁷⁵⁸ _{Nov. 16, 18} does not believe that in all cases the *so-called scrofulous forms of conjunctivitis* are expressions of general scrofulosis, but claims that in only 5 per cent. of such cases is this true. He asserts that the remaining number should be attributed to such causes as heredity, in poorly-developed children of parents tainted with tuberculosis, syphilis, etc.; improper nutrition and bad hygiene; facial eczema and infectious diseases; and predominantly to blepharitis, particularly the ulcerated form, which, he thinks, gives rise to the dangerous forms of conjunctivitis.

From a symptomatic stand-point, Valude¹⁴ _{Mar. 25} divides *ophthalmia neonatorum* into three varieties: 1. A typical, grave, purulent form, appearing on the third day after birth—the true *blennorrhœa neonatorum*. 2. A benign catarrhal form, which may appear on the third day, or sooner, without a fixed time. 3. A chronically-inclined, persistent variety, ordinarily seen in weakly or premature infants, either primary or occurring secondarily to *blennorrhœa*—the follicular catarrh of classic writers. In prophylaxis he combines the methods of Crédé and Hégar-Korhn, practicing this step before section of the cord, as advocated by Olshausen. A suggestive con-

tribution is made to the etiology of ophthalmia neonatorum in the history of a case reported by Nieden.³⁵³ The fifth child of a family was born with the membranes unruptured, but, despite the most rigid precautions, developed purulent conjunctivitis. In each of the other children this disease had developed shortly after birth, but with progressive diminution both in intensity and in the number of gonococci in each succeeding case; the secretion in the last child failing to show the presence of the coccus. The father had had gonorrhœa, but there had been no acute infection immediately preceding or following marriage. The mother always had slight leucorrhœa in the latter half of pregnancy; but no gonococci were found in the discharge. The conclusion forces itself upon the author that, in the last case, the amniotic fluid must have contained a noxious agent capable of exciting a purulent conjunctivitis. Santos-Fernandez³⁵⁹ believes that many cases of simple catarrhal conjunctivitis among the ignorant classes are transformed into the purulent type by being treated with some of the dirty and disgusting lotions which are held in high esteem as "household remedies." Grandclément²¹¹ calls attention to the danger of using strong solutions of bichloride as a lotion in ophthalmia neonatorum, since some infants seem to have a particular susceptibility even to a 1-to-1000 solution. Before having recourse to this radical treatment, he advises that search be made for the gonococcus, in order to settle the diagnosis. Vincent²¹¹ reports successful prophylaxis from lotions of sublimate—0.007 gramme ($\frac{1}{3}$ grain) to the litre (1 quart)—and cauterization twenty-four hours after birth, with a 1-per-cent. solution of argentic nitrate. As a prophylactic measure, which he pronounces superior to Crédé's method, Valude¹⁷¹ recommends a light cleansing of the lids with damp cotton, and the insufflation of a pinch of iodoform into the conjunctival sac, immediately after the birth, and before the cord is tied. Experiments in Tarnier's clinic gave a result of 2 per cent. of cases of ophthalmia, as opposed to 5.9 per cent. in a series treated by Crédé's method. From the efficacy of the methods applied at various lying-in institutions, Snell⁶ considers it established that the ophthalmia of the newborn is a disease which permits of distinct prevention. He believes that even careful cleansing with plain water is sufficient, but thinks that the addition of an antiseptic is preferable.

In an article on "Our Public Institutions as Sources of Impair-

ment of Vision," Lippincott¹⁶¹ gives the following conclusions: That blindness is increasing out of proportion to the increase in population; that granular conjunctivitis, which is an important factor in producing impairment of vision, is a contagious disease disseminated largely through the agency of eleemosynary institutions; that this affection can be excluded from such institutions by rigid inspection (including systematic eversion of the eyelids) of all new applicants; that a further spread of the disease in establishments where it exists can be prevented by absolute isolation of infected cases, and by allotments to each individual of a towel for his or her exclusive use; that examinations of the eyes of all the inmates, preferably by an ophthalmologist, should be made at stated intervals, not less frequently than twice a year; that each child should have his own towel and use it alone and that appropriate penalties should attend infraction of this rule; and that the efficacy of these measures would be greatly enhanced by close attention to general sanitary requirements, including adequate ventilation, personal cleanliness, as varied diet as possible, etc. Troussseau¹⁷³ says that crude petroleum is an antiseptic of some power, and a modifier of conjunctival infections; that, being always well supported, causing no painful reaction, and being easy of application, it is indicated for children and timid subjects; and, finally, that it is capable itself of curing certain conjunctivites, and, preceding or following another agent or associated with antisepsics, it may prepare for or complete a cure.

Peters⁶⁰ has made an extended study of the *goblet-cells of the conjunctiva*, found in cases of chronic catarrh, spring catarrh, follicular and granular conjunctivitis. Whenever goblet-cells occurred, there appeared, free in the tissues or contained in leucocytes or epithelial cells, peculiar granules that, upon careful investigation, proved to be eosinophilic granules. Thus, he asserts, there exists a correspondence between the catarrhal processes of the conjunctiva and those of the nose and trachea, in which, in addition to goblet-cells, eosinophilic granules have been found. Troussseau¹⁷¹ has seen 4 cases of *spring catarrh*, all of which showed decided disease of the naso-pharynx. He raises the interesting question of relationship between the two conditions, but is convinced that treatment addressed to the nasal condition alone is rarely successful. Couëtoux¹⁷¹ reports a case of the same kind.

In a case of extensive *serpiginous ulceration of the cornea* occurring during the course of *purulent ophthalmia*, Couch⁷⁷⁶ claims to have arrested the destructive process by direct corneal feeding, using juice expressed from beef for the purpose. In such case K. Scott²⁰³⁹ obtained very satisfactory results from the use of perchloride of mercury, 4-per-cent. aqueous solution (which is made by dissolving the mercuric salt in glycerin and then adding water), applied to the everted lids once a day, associated with the use of a $\frac{1}{4}$ -per-cent. solution as a wash. In the trachoma cases iron tonics are also prescribed.

Sattler⁴⁰⁵ sketches the history of the treatment of *trachoma* from the time of Hippocrates and the ancient Egyptians to the present, and describes his own well-known method in detail. In a paper on the relation between trachoma and follicular catarrh, Medwedew²¹ expresses the belief that they are distinct diseases. Elschnig⁵⁷, believes that 3 varieties of *granular conjunctivitis* can be recognized: 1. An acute, light form, with the rapid formation of follicles and severe conjunctivitis, which can be fully cured in a few months, or even weeks. 2. A chronic, light form, with few subjective symptoms, but many follicles, mostly superficial; although very obstinate, it can be fully cured by treatment, it may be, of years' duration. 3. A chronic form with severe complications, which alone is recognized as trachoma by the dualists. He recommends treatment with solution of corrosive sublimate, varying in strength from 1 to 5000 to 1 to 2000, according to the severity of the case, the amount of reaction, and the pain caused. Muttermilch¹⁷¹ has written a valuable paper on the pathological anatomy of chronic inflammations of the conjunctiva, which is especially interesting in its consideration of trachoma.

Raehlmann⁸⁴ contributes several papers on the pathology of trachoma, which re-embodies the views expressed by him at the last International Medical Congress at Berlin, of which we gave a full abstract last year. Grosz⁸⁴ strongly contests the theory that trachoma is identical with acute blennorrhœa, and that follicular conjunctivitis is but a variety of trachoma. He maintains that trachoma is a disease *sui generis*, from which follicular conjunctivitis is to be distinguished, both by its etiology and by its course. Statistics of trachoma may be obtained by examination of every individual in a given district; by a study of the recruiting lists; by

a comparison of the cases presented in a large public ophthalmic service ; and by compulsory reports of cases on the part of medical men. Truc¹⁷¹ concludes a study on the relations of "lymphatism" to trachoma with the following propositions : "Lymphatism" is the clinical soil of trachoma. It favors the development and modifies the general aspect of granular ophthalmia. In its various degrees it constitutes the forms which may be grouped as lymphoid or fungoid, scleroid, and fibroid. It is the principal factor of granular lesions of the cornea ; it is also the clinical soil of phlyctenular or scrofulous conjunctivitis. There exist morbid combinations in which granular ophthalmia is mixed with phlyctenular, constituting granulo-lymphatic ophthalmias. Lymphatism, again, is the soil of certain lachrymal keratites, and combinations with the preceding forms occur. The condition favors trachomatous infection and contagion in proportion to its degree. Noiszewski¹⁸⁰ claims to have discovered the *micro-organism of trachoma*, which he calls "microsporon trachomatosum seu jagium." He describes it as consisting of fibres and conidia arranged in large heaps of yellowish-brown color, separated by irregular intervals. The conidia are small and yellowish. The fibres have no septa ; they ramify densely and interlace. The threads are of varying thickness and direction. From the coarse threads innumerable filaments are given off at an acute angle. The author has succeeded in cultivating the jagium upon gelatin obtained from calves' eyes. Inoculations upon the conjunctiva of rabbits have been successful, the visible changes not taking place until four or five weeks after the operation. Cheatham¹⁰⁰⁷ attributes the primary cause of trachoma to an error of refraction, which "prepares the soil for the reception of the germ." He believes that the correction of this error will prevent many relapses of the disease. Fulton¹⁰⁰⁷ says that "it is distinctly a local disease and is not a symptom of any constitutional dyscrasia," and that it is due to a specific germ which "seems to act only on the conjunctiva, producing a pathological product to be found nowhere else."

Burnett¹⁰⁰⁷ gives the following points as favoring the view that an essential dyscrasia underlies trachoma : (1) the fact that certain races enjoy an immunity from the disease ; (2) that its development is impeded at altitudes greater than one thousand feet ; (3) that it is not purely contagious, like, for instance, ordinary

blennorrhœa of the conjunctiva. The author says: "We do not yet know the exact nature of this dyscrasia, but it is fair to assume that enfeebled vital powers play an important part in its development."

During an experience of sixteen years, in which he has seen 25,800 cases of ocular disease in Cuba, Fernandez¹⁷³ has found only 689 cases of granular conjunctivitis and trachoma. Of these, only 10 were negroes and 26 mulattoes. In this number only 1 case of true trachoma was observed. With a population of blacks numbering nearly one-half the whites, these figures become very suggestive. The author therefore believes in the asserted immunity of the negro from this disease.

In a paper considering the treatment of trachoma, Eliasberg²³² _{Sept. 15} concludes as follows: (1) in trachoma granulosum (Arlt) and in trachoma diffusum, direct massage of the conjunctiva with powdered boric acid should be preferred to sulphate of copper and "pierre infernum," on the one hand, and to surgical procedures, on the other, because of its excelling the former in rapidity and the latter in safety; (2) in the regressive period of the disease, and in exacerbations, creolin (1 per cent.) and sublimate (1 to 400) render the best service. Hodges²⁰¹² _{Apr. 28, May 1} claims excellent results in the treatment of acute and chronic conjunctivitis (trachoma) from the employment of freshly precipitated iodide of silver. He has obtained equally good results from the remedy in ophthalmia neonatorum, and has found it efficient in simple ulcerations of the cornea, when combined with a weak solution of eserine. For recent cases of trachoma, with moderately enlarged follicles, Kazaurow²¹ _{Apr. 6} recommends silver nitrate and cupric sulphate. Ulcerations of the cornea do not, in his opinion, contra-indicate the use of silver nitrate, since he has seen such ulcers heal by the use of strong solutions (up to 5 per cent.), when other remedies—atropine, iodoform, etc.—had failed. In the event of failure by this treatment, he prefers curetting with the sharp spoon, claiming to considerably diminish the resulting contraction by massaging the lids with powdered boracic acid, and afterward washing with a 4-per-cent. solution of the same drug. In very old cases, and in xerosis, he employs creolin emulsion (1 to 2 per cent.) as a collyrium or a continuous irrigation.

In a form of conjunctivitis granulosa "characterized by a few isolated or grouped raised points on the tarsal conjunctiva of the

upper lid, having a reddish-yellow appearance, of a hard, cartilaginous feeling to the finger, and so minutely attached that they cannot be raised by the finger-nail," Keyser¹⁰⁰⁷ has succeeded in rasping the formations down by using a broad pencil of pumice-stone. Darier^{177, 19} describes a radical method of treating trachomatous granulation as suggested by the practice of Sattler. The patient is anæsthetized, and the lids are rolled back twice upon themselves, by means of special forceps, so that the whole conjunctival surface is completely exposed. The membrane is then freely scarified, so as to lay bare the deeply infiltrated granulations, and is well scraped with a sharp curette. Finally, the bleeding surface is mopped with a firm brush, soaked in a solution of sublimate, 1 to 500. The operation is tedious, as no point of diseased tissue must be overlooked. The results in 25 cases thus treated are said to be most encouraging, smooth and supple cicatricial tissue being formed within a few days after operation.

Harvey¹ _{Sept. 30} has devised two instruments to aid in the scarification treatment of trachoma. The first is a pair of forceps, intended for evertting the lid: it consists essentially of two blades, sufficiently long to engage the entire length of the lid, and so narrow that they include little more than the ciliary margin of the conjunctival surface. The jaw intended for the lower surface of the lid is set with a row of fine teeth, long enough to penetrate the conjunctiva and obtain sufficient hold to prevent slipping in the act of eversion. The opposing jaw is perfectly smooth. The second instrument, which is used for scarifying, is composed of four blades, about one-fourth of an inch in length, placed parallel and separated by about one-fifteenth of an inch. Each blade is brought to a point on its cutting edge, and so inserted into a handle of platinum that it can be removed, cleaned, and sharpened without difficulty. Sedan¹⁷³ _{Apr.} criticises some recent "sure methods," and affirms that no single remedy can be recommended for the treatment of every case of this trachoma. Dowling⁶¹ _{Nov. 7} has had success in the treatment of granular conjunctivitis by touching the lids twice a week with a mitigated stick of nitrate of silver, and immediately washing the excess off. On the intervening days he rubs in an ointment composed of yellow oxide of mercury and atropia. E. Smith¹⁰⁰⁷ describes "a new method of operating on the 'frog-spawn-like' oculo-palpebral folds." He states that in cases having the redundant folds, he

slits the conjunctiva with a Graefe knife the full length of each fold, and with forceps makes a squeezing and stripping motion, expelling, along with a bloody serum, the gelatinous bodies *in toto*. In cases of "isolated bodies," he slits the conjunctiva across the top of the follicle and, placing a blade of the forceps on each side of it, squeezes it out. The forceps used in the operation are shaped similarly to iris forceps, but without teeth, and having a long curve. In the "diffuse variety of thickening" he assists the cure "by scarifying the thickened edge of the everted cartilage and squeezing with a pair of entropion forceps, one blade in the retrotarsal fold, the other in front of the cartilage." T. D. Myers²⁰⁵ states that "any successful plan of treating this disease must first of all include some means of killing or removing from the tissues the micro-organisms existing there, without permanent injury to the normal conjunctival structures. It must enable us to remove, or render less easy of assimilation, the excess of nutriment, which, in the shape of albumen and albuminoid substances, is produced by the rapid disintegration of tissues, and which acts as a rich mulching material to the fixed tissue-cells, stimulating their proliferation far beyond the degree required for the formation of healthy tissue." He believes that these conditions are best met by electrolysis, using the extreme end of a very delicate platinum or iridium negative electrode, and following the supply vessel of a granulation back to its origin, thus coagulating the albuminoid nourishment at its fountain-head. Von Hippel²⁰⁶ recommends rubbing the mucous membrane with a bit of cotton, saturated with a solution of mercuric chloride, 1 to 1000; the more anaemic the mucous membrane, and the larger the follicle, the greater should be the pressure exerted. The expression of the contents of the follicles is desirable, but not always possible. The procedure is contra-indicated should manifestations of iritic irritation appear. The treatment may occupy from ten days, in recent cases, to many months, in the more inveterate forms. The results, however, afford no assurance of non-recurrence.

According to Herrnheiser,²⁰⁴ trachoma is exceedingly prevalent in Bohemia. Of 3950 eye patients in Sattler's clinic in 1890, 160 had trachoma. He describes the method of Sattler, and gives the results of the treatment during an epidemic. In 76 persons, 150 operations were done, the average duration of the treatment being

about twenty-three days. Up to the time of reporting, there were recurrences in only 2 cases, and these had been operated upon under cocaine anæsthesia. During an epidemic in an orphan asylum, Herrnheiser ⁵⁷ had an opportunity of testing Sattler's method. Of 132 children, 44 were attacked, of whom 19 were subjected to this treatment. The disease was speedily suppressed. No new cases developed and no relapses occurred.

Veszely ⁸ admits that trachoma may be cured in the course of (not as a result of) medical treatment, but he believes that the best remedy consists in removing a sufficient amount of the palpebral *cul-de-sac*. Anfuso ⁵⁸⁹ speaks highly of the method of extirpation of the retro-tarsal *cul-de-sac*, citing a number of illustrative cases. In a short paper, Santos Fernández ⁴⁹⁴ reviews the more modern methods for the treatment of granular ophthalmia. Brinckerhoff ⁴⁹ claims excellent results in the treatment of granular conjunctivitis from the daily application of a mixture of equal parts of saturated solutions of iron, alum, zinc, and copper, to the tarsal conjunctiva. Liebrecht ³⁵³ has seen a case of *conjunctivitis* of both eyes, which he believes was *caused by constitutional gonorrhœal infection*. The conjunctiva did not present the characteristics of blennorrhœal inflammation, and the secretion was thin and stringy, containing no gonococci. In one eye, the pupil was occluded by a fibrinous exudate, and subsequently there was a superficial infiltration of the cornea. During the subsidence of the conjunctival disease, rheumatism appeared; and a second outbreak of rheumatism occurred, accompanied by renewed inflammation of the conjunctiva. While the above pathological processes were active, the primary urethral disease disappeared. From the symptoms and course of the disease, the author believes that the ocular inflammation probably resulted from a constitutional infection from the primary local disease, either through the gonococcus or a chemical product derived from it,—more probably the latter. This view, he thinks, is supported by the cases reported last year by Deutschmann. (See ANNUAL, 1891, vol. iv, B-127). Abadie ⁶ believes lemon-juice to be greatly superior to nitrate of silver in the treatment of all cases of *diphtheritic* or *diphtheroid conjunctivitis*. In many cases he has seen silver do harm, while the lemon-juice, applied at first every five hours, has given satisfactory results. Fage ²⁷⁴ reports a case of pseudo-membranous conjunctivitis in a child of 15

months, in which he made experimental cultures from the membrane. No bacillus was found, only the streptococcus and the staphylococcus pyogenes albus. This study, he believes, confirms the view that there are two distinct varieties of pseudo-membranous conjunctivitis, only one of which is truly and specifically diphtheritic.

DISEASES OF THE CORNEA AND SCLEROTIC.

Bull, of Paris,¹⁷³ considers the *monocular polyopia*, often noticed after prolonged use of a lens or microscope, as being caused by a wrinkling of the cornea, produced by the continued pressure upon it by the eyelids. Treacher Collins²⁰³⁶ has made a careful study of 2 cases of *staining of the cornea by blood-pigment*. In the first case, the central part of the cornea was stained a brownish color, leaving a narrow, clear, and colorless rim at the periphery. Intra-ocular tension equalled—1, and there was no light perception. After enucleation, the discoloration of the cornea was seen to extend throughout the whole thickness. The anterior chamber was filled with blood-clots, the lens was opaque and calcareous, and the vitreous was shrunken. There was complete detachment of the retina, and projecting from its outer surface were two transparent cysts. Examination with the microscope showed that, disseminated throughout the discolored portion of the cornea, there were numerous small refracting granules, mostly of an oval or circular form. In the second case, in the centre of each cornea there was an irregular-shaped patch of a rusty-brown color, surrounded by a zone of bright red. The author thinks that there can be no doubt but that the pigment was derived from the blood, as he finds that in all the cases reported there was blood in the anterior chamber. The practical conclusion of Eberth's study³¹ of the *regeneration process in the cornea* is, that leucocytes do not participate in the proliferative changes—formation of embryonic tissue and the new formation of definite elements (corneal bodies)—nor are leucocytes observed to multiply by “karyokinesis.”

Hirschberg¹⁹⁰ reports a case of *keratoconus*, which had existed thirteen years without treatment, the patient still showing ability to decipher small letters. Thirty-two years previously he had been operated upon for a similar condition of the right eye without success. At that time the condition was just beginning in the left eye.

Du Bois-Reymond ³⁶⁸ has seen a *fistula of the cornea*, consequent upon a perforating ulcer, in a patient having acne vulgaris and acne varioliformis. Fraenkel ³⁵³ reports the case of a dyer whose face had been scalded and the right cornea in large part destroyed, an extensive *staphyloma* resulting. A bandage was applied, and the patient disappeared from observation. Six months later, the remaining portion of the cornea had united with the corresponding surface of the lower lid, causing complete disappearance of the staphyloma. The adhesions being cut through, an adherent leucoma remained, with closure of the pupil, but with good projection. In *operating for staphyloma of the cornea*, Camo, of Lima, ²⁷⁴ does not think it necessary to remove all the corneal tissue. He is enabled to insure better and quicker results by the preservation of portions of cornea, which he unites by suture. Being covered in by conjunctiva, this corneal tissue is protected from irritation, and will not interfere with the subsequent use of an artificial eye. In a case of staphyloma resulting from ulceration, Graves ⁷² succeeded in restoring the anterior chamber and causing appreciable recession of the bulging by severing the attachments of the iris to the cornea. Galezowski ¹⁷³ states that the operation of *suturing the cornea and the sclerotic* is indicated (1) in certain grave accidents occurring during or after cataract extraction; (2) in tears and perforating wounds of the cornea; and (3) in wounds of the sclerotic. In the first category he includes gaping of the wound-edges (with immediate or subsequent hernia of the iris), and re-opening of the wound from accidental blows during the first week after the operation. This last-mentioned most serious accident has occurred in two of the author's cases, and has been successfully treated by suture. In the second class, before proceeding to suture, the operator should determine whether the iris is wounded or whether there are shreds of iris-tissue floating in the anterior chamber. In case such shreds are found, they should be at once excised. The condition of the lens should be ascertained, and any fragments of cortical matter, freed by injury to the capsule, should be removed with the curette. Injection of an antiseptic solution into the anterior chamber is deprecated, as provoking pain and exposing the eye to attacks of iritis. In cases of severe wounds of the sclerotic the author claims undoubted success and the preservation of a useful globe, by immediate application of the suture. The

technique of these operations is given in minute detail. S. C. Ayres⁷⁶ reports a case of *papilloma of the cornea*, occurring in a healthy woman 50 years of age. The growth occupied the entire anterior portion of the left eye, and had the appearance of a cauliflower, the edges spreading out beyond its attachments to the globe. Study of the tumor with the microscope showed it to consist of exceedingly delicate papillæ, appearing to be continuous with the corneal tissue. The interesting histological feature was the very long, slender, and delicate character of the papillæ, which were apparently primary. In a man of 44 years, Duboys de la Lavigerie¹⁷¹ observed an "epithelial hyperplastic plaque" of the cornea, which he believes should be classified with the 3 cases recorded respectively by Hocquart, Gayet, and Warlomont. The growth had first appeared three years previously in the conjunctiva on the outer side of the corneal limbus, and had been ligated twice, but had each time recurred, extending farther and farther on to the cornea. While presenting the general microscopical appearance of epithelioma, the author does not believe it to be such, because of the exaggerated reproduction of corneal cells which the sections show.

Rumschewitsch²⁵⁴ describes a *sarcoma of the cornea* of interest from the fact that it sprang directly from this membrane, and not from the limbus, as is generally the case. The other structures of the eyes were normal, except that the peripheral parts of the retina were the sites of cystic degenerations. Histological examination showed the tumor to be made up of blood-vessels, round and spindle-shaped cells, lymphoid cells, and cells in transition stages between lymphoid and sarcomatous cells. The author agrees with Schöbl in believing the origin of these tumors to be from the lymphoid cells derived from the blood-vessels.

In a case of *corneal ulcer*, Campbell¹⁰⁰⁷ has seen the deposition of a thick coat of oxide of lead over the whole corneal surface, resulting from the employment of a supersaturated solution of acetate of lead, preceded by the excessive use of a 2-per-cent. solution of cocaine.

Nieden¹⁹⁰ recommends the application of a 2-per-cent. solution of "fluoresceïnkalium" to the cornea previously to the use of the galvano-cautery, in cases of infectious infiltrations and ulcerations of the cornea. He claims that, by its staining qualities, the area of the disease is so sharply marked out that the affected portions

can easily be destroyed in one or two applications of the galvano-cautery. Bronner² considers fluorescin of diagnostic value in accurately determining the extent and depth of corneal inflammation, and in finding how much of the interstitial tissue is affected.

A case of periodically occurring attacks of *keratitis*, apparently depending upon menstrual disorder and chlorosis, is recorded by Ransohoff.³⁵³ Usually both eyes were affected, the attacks beginning after the appearance of the flow and lasting a few days longer. In the intervals the eyes were well and the vision good. Manz³⁴ describes a peculiar form of bilateral chronic keratitis, which differs in many respects from the forms described by Adler, Reuss, Groenouw, Stellwag, and others. It was characterized by the formation of numerous pin-head-sized, discrete, gray opacities, partly in and partly under the epithelium, which, gradually changing to a white color, worked their way to the surface, forming prominent small papules, and giving the sensation of a foreign body. After rupture, little excavations remained, which, in from several days to two weeks, healed, with the formation of minute opacities. The attacks were recurrent, extending over a period of ten years or more, and were accompanied by photophobia, pain, lachrymation, and diminished vision. There was some pericorneal injection, but no superficial clouding of the cornea. Slight discoloration of the iris was noticed. The microscope showed that the contents of these papules were minute fat particles and small and large, fatty-degenerated epithelial cells. Treatment was not very satisfactory. Czermak³⁵⁸ describes 6 cases of the so-called Fädchen-keratitis of Leber, Uhthoff, and Fischer. From microscopical studies and experiments, he concludes that under certain unknown conditions, after erosions of the cornea, an exudate material appears, having a glassy matrix, which contains leucocytes, and that, through the motions of the lids and eyeball, there is a transformation of the cells into fibrillæ, which subsequently become twisted into spiral fibres, closely resembling the "Curschmann spirals" found in the mucous expectoration of bronchial asthma. In support of this theory, he states that he has been able to produce artificially, by treating the mucoid material of hyperæmic conjunctivæ, fibrillæ and fibres similar in appearance to those found in the disease. He thinks that the cases described as "Fädchen-keratitis" should be classified as herpes corneæ, and that in many cases of herpes these

fibres have been present, but have been dissolved before being observed. Topolanski⁸⁴ has seen 6 cases of a peculiar form of keratitis, which he attributed to an infectious cause. In general appearance all these inflammations resembled the form described by Fuchs as keratitis superficialis punctata, and by Reuss as keratitis maculosa. Two cases had followed slight injuries of the cornea; 2 had followed severe catarrhal inflammation; the fifth patient had, at the same time, nasal and bronchial catarrh; and the sixth, while free of other disease, developed this keratitis while living in the same house as 2 of the preceding cases. The author attributes the corneal changes to alterations in the nutrient fluids of the cornea, leading to parenchymatous changes and destroying the transparency of the contents of the lymph-canals. Pflüger²⁰⁴ describes a case of keratitis ulcerosa chronica with uveitis and hypopyon, which, he thinks, was probably of bacillary origin. As can be seen in the accompanying chromo-lithograph, the supposed pathogenic organism resembles somewhat the bacillus of diphtheria, in that it shows the same cuneiform disposition; but it differs in being too pointed. Injection experiments with cultures gave negative results, and thus distinguished this organism from the bacillus of Löffler. Tschermak⁸⁴ has seen a case of keratitis which presented the aspects of the keratitis marginalis described by Fuchs. Du Bois-Reymond³⁵³ notes 2 cases of keratitis, 1 of them complicated with iritis, occurring in women of advancing age suffering from malignant uterine disease. He believes the ocular trouble to have been caused by infectious emboli.

Marlow^{1,18} has seen 2 cases of *interstitial keratitis* occurring in adults, in the tertiary period of acquired syphilis. Both showed marked contrast with the inherited form in the short duration of the disease, the complete clearing of the cornea, and in a stage of keratitis punctata. Van Rijnberk, of Amsterdam, corresponding editor, sends us some interesting statistics of interstitial keratitis collected by Werndly²⁰⁴⁷ in his thesis. Among 15,000 patients, the author found only 42 cases of this disease; of this number 16 were males and 26 females. As a rule, the affection was bilateral, in only 9 cases occurring on one side. The average age of development was 13½ years, the earliest being 3 months and the latest 30 years. The complications of most frequent occurrence were affections of the tractus uvealis, and especially iritis; in all,



Bacillus found in a case of chronic ulcerous keratitis with uveitis and hypopyon. (Pflüger.)

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40 per cent. Characteristic teeth were found in 40 per cent., which is about half that given by Hutchinson. In more than half the cases hereditary syphilis could be proved (55 per cent.). Inouye¹⁰⁰ _{Aug.} reports from Tokio, Japan, a case of keratitis parenchymatosa propria, peculiar in the absence of marked inflammatory symptoms, and showing no pericorneal injection. With a strong convex lens, hundreds of small, white, punctiform opacities could be seen in the centre of the membrane. Valude¹⁵² _{Mar. 30} mentions a case of monocular interstitial keratitis in a boy of 17 years, appearing a few days after a slight wound of the cornea from a small chip of steel. The patient presented the facial characteristics of hereditary syphilis, and had typical Hutchinson teeth, but had never had interstitial inflammation of the cornea.

Crouzet¹⁷³ _{Oct.} has seen an interesting case of hereditary interstitial keratitis with synovitis of both knee-joints, in a boy of 12 years. Trattner⁸⁵³ _{Oct.} describes a case of double congenital corneal opacity with anterior synechiæ, existing, with congenital microphthalmos, in the person of an apparently healthy woman of 31 years. He is disposed to attribute the abnormal conditions to intra-uterine parenchymatous keratitis, the result of hereditary syphilis, despite the absence of a specific history and all other evidences of hereditary taint—excepting, perhaps, the appearance of the teeth, which, though well preserved, were small.

De Schweinitz³⁴⁷ _{Apr.} considers the actual cautery "applicable especially to sloughing ulcers, to ulcers in which the spread of local infection is the dominant symptom, to ulcers which decline to heal under moderate means, like the bichloride-of-mercury method, the compressing antiseptic bandage, the use of eserine, the application of milder cauterization with solutions of nitrate of silver, powdered iodoform, or scraping the base of the ulcer with a small curette." Claiborne¹ _{May 30} believes that the actual cautery is indicated in all infected ulcers of the cornea, and that, when properly and thoroughly applied, it acts quickly, safely, and happily. Deliquescent carbolic acid is highly recommended by Suarez de Mendoza¹⁷¹ _{May, June} as a cauterizing application to corneal ulcers. A single cauterization in the commencing stage, he says, will at once convert the ulcer into a healing wound.

In deciding upon the advisability of performing paracentesis in cases of hypopyon keratitis, Ayres⁵³ _{Nov.} is guided by the pain com-

plained of. If the eye is not painful, he does not resort to the operation, but relies on hot fomentations, antiseptics, compress bandages, atropine, rest, and anodynes, with liberal doses of quinine in feeble persons.

Schwabe¹⁸ recommends operative treatment for the scrofulous forms of keratitis, and claims that since 1885 he has had 95 cases in which operation checked the progress of the disease and gave protection against recurrence. His operation is a modification of that proposed by Ammon, in 1829, for blepharophimosis. Valude⁸ describes a simple method, first proposed by Gaïta, for the treatment of grave ulcers of the cornea complicated with hypopyon. After washing the conjunctival sac with a 1-to-5000 sublimate solution, he covers the closed lids with a thick compress of salolized gauze, antiseptic cotton, and, finally, a damp tarlatan bandage, which, in drying, forms an immobile dressing and secures equal compression. This dressing is renewed every three or four days, till cure is effected. Valude claims very satisfactory results from this treatment, with the least possible opacity of the cornea remaining. The same success, he says, is achieved in simple ulcers without hypopyon, in scrofulous ulcers of children, and in all ulcerative keratites. In cases of hypopyon from traumatic ulcer, R. Williams¹⁸⁷ finds that the instillation of a drop of a weak solution of sulphate of quinine and atropine, every two or three hours, rarely fails to cause absorption, if the case be seen before the pus has become thick and glutinous. Bane¹⁸⁵ claims excellent results from the use of a warm solution of chlorate of potash, 5 grains (0.32 gramme) to 1 ounce (31 grammes), in phlyctenular ulcerations of the cornea. For the cure of hypopyon keratitis Manché² strongly recommends the instillation of a solution of sulphate of eserine, 2 grains (0.13 gramme) to 1 ounce (31 grammes), and the constant application of a bandage, together with general tonic treatment. In the treatment of infectious ulcers of the cornea, Chibret¹⁷³ attains excellent results from touching the ulcer once or twice daily with tincture of iodine. The advantages claimed are the prevention of staphyloma and the formation of corneal cicatrices less opaque than those resulting from other methods of treatment.

From his experience with the tattooing of corneal opacities, Hirschberg⁶⁹ claims that if there is a portion of the pupil free,

even though it is quite small, more improvement of vision is obtained by this plan of treatment than by iridectomy. He also recommends the operation in cases in which there is no light perception, for its cosmetic effects; and states that, preceding its performance, iridectomy need not be performed. He claims, further, that under antisepsis it is not a dangerous operation, and does not produce irritation. He recommends its performance, also, when there is a small opacity in the pupillary region; in keratoconus, after burns; and in lamellar cataracts, after iridectomy. The punctures should be made obliquely, particularly in thin corneas. In cases of *central corneal nebulae*, Ferdinands²_{May 16} has had improvement in vision follow the gentle rubbing of the opaque cornea with the rounded end of an India-rubber pencil-eraser, for the space of a half-minute or less, the rubbings being repeated every other day. Malgat¹⁷³_{Sept} has obtained very gratifying results in corneal opacities, by systematic massage, combined with the use of an antiseptic ointment. He limits the class of cases suitable for this treatment to those which have resulted from abscess or ulcerations of the cornea. Such opacities—nebulæ, albugos, and leucomata—are formed, in part, from cicatricial tissue of new formation, and, in part, by the infiltration of plastic exudate into the corneal stroma. The method encourages the absorption of this plastic exudate alone. A small portion of an ointment composed of equal parts of lanolin and mercury is introduced between the lids of the affected eye, and then through the closed lids a gentle circular friction is made with the ball of the thumb for a minute. After the massage, the conjunctiva is bathed with a solution of boric acid (3 per cent.) or aniline violet. The operation should be performed daily, and kept up faithfully for months. This treatment is contra-indicated in the presence of inflammatory disturbances of any kind in the eye or its appendages. In the treatment of *wounds and ruptures of the sclerotic*, Fage¹⁸⁸_{Feb. 19} again pleads for a more general recognition of the value of the suture.

Tschermak⁸⁴_{Feb. 28} has seen a case of *simple venous angioma of the sclera*, consisting of a number of blood-vessels which formed a band one centimetre wide around the cornea. From the great loss of accommodation, he believes that the ciliary body was affected by the same condition. Weinbaum²⁰⁴_{Apr.} reports 2 cases of *episcleral sarcoma*. In the first case the patient died from general metas-

tasis two years after the local tumor was first observed, the eye not having been enucleated. The recurring tumors were removed by the knife and their sites cauterized. In the second instance the tumor was extirpated and the disease did not recur until seven years after the operation. Nine years after the removal of this new growth the patient died of tuberculosis, without, as the author claims, having had any further return of the malignant disease. From these two cases of episcleral sarcoma, the author concludes that as yet it is impossible, from either a clinical or an anatomical stand-point, to form a reliable prognosis, or to say that enucleation would be any better protection against general infection than local eradication of the tumor done, if need be, repeatedly. He therefore thinks that it is justifiable to attempt to save the eye, and agrees with Silex, that it is possible to save it for a long period of years without endangering the individual from general metastasis.

Norsa⁸³⁹ claims to have treated successfully 3 cases of *scleritis* and *episcleritis*, of rheumatic or syphilitic origin, by means of the electric bath. The positive pole was applied over the superior cervical ganglion of the sympathetic, while the negative was introduced into a glass containing a 1- to 2-per-cent. solution of salicylate of lithium. One to 2 milliampères were employed.

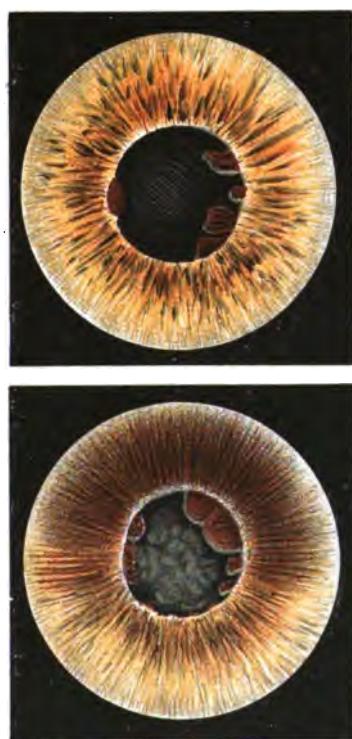
DISEASES OF THE IRIS AND CILIARY BODY.

Eversbusch⁸⁴⁰ reports a case of *ciliary neuralgia* following a needle puncture. The symptoms resisted ordinary treatment. Finally, conceiving that the original injury had involved the periphery of the iris, perhaps also the ciliary body, and that one or more filaments of the ciliary nerve had been caught in the resulting cicatrix, the author applied the galvano-cautery, with complete relief of the symptoms.

From study of a case of *buphthalmia*, Kalt¹⁷¹ concludes, as to the pathological anatomy, that (1) buphthalmia is the consequence of a very chronic irido-choroiditis, which determines a progressive obliteration of the vessels of the uveal tract; (2) there is produced an intra-ocular hypersecretion, whose origin is very probably not in the cells which cover the ciliary processes, a great part of these being destroyed; (3) this hypersecretion should be admitted, since the excretory channels have been found considerably enlarged, as in the infant's eye—therefore not a question of glaucoma by

Ectropion, Uveal. (Wicherkiewicz)

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retention; (4) eserine made the tension fall to normal. As the irido-corneal angle was found to be largely permeable, even in the eye of the cadaver with wide pupil, it is incorrect to admit that eserine acts by freeing the iris from this angle, whither it has a tendency to retract. Since the smooth muscular apparatus of the eye was little damaged, Kalt believes that here must be sought the explanation of the action of eserine upon the intra-ocular pressure. Juler²⁰³⁸_{v.ii} saw a case of double congenital buphthalmos in a baby 3 weeks old. In his opinion the condition "was one originally commencing with intra-uterine cyclitis and iritis, with increased intra-ocular tension, followed by atrophy of the ciliary body and iris, terminating after birth in perforation of the cornea, escape of the crystalline lens, and total loss of function of the eye."

McHardy²⁰³⁸_{v.ii} has removed a *cyst* from the *anterior chamber* of a child 9 years old. The growth, which was transparent and nearly ovoid, was situated immediately *against the anterior surface of the iris*, at the lower and inner part. Behind the cyst there appeared to be a triangular opening of the iris, with its apex toward the intact pupillary margin. The cyst grew rapidly, lost its transparency and caused some contiguous hyperæmia. To effect its removal, a small iridectomy having been made on either side of the cyst, it was grasped and ruptured with forceps and snipped off from its peripheral attachments. Wicherkiewicz²⁰⁴_{Apr.} describes a case of *ectropion uveæ*, which he believes to be *congenital*, since there was no evidence of inflammation and no deposits of pigment on the lens-capsule. The appearance is well shown in the accompanying chromo-lithograph. He thinks the case unique, because of the size of the pigmented excrescences, and on account of a thick layer of pigment over half the anterior surface of the iris. The most probable theory as to the etiology of this condition is that of Bach, namely, a deficient involution of the pupillary membrane and a great foetal hyperplasia of the uveal pigment. Charnley²_{Sept. 12} reports a case of *tumor of the iris* in a boy 16 years old. The growth, which was small and unpigmented, was removed by iridectomy from the lower inner part of the iris. Histologically, it appeared to be a vascular tumor undergoing sarcomatous changes. In speaking of the *development on the iris of small reddish nodules*, which may disappear spontaneously, to be followed in very many cases, after a time, by the appearance of *tubercles*,

Leber⁶⁹, says that he believes, with Habnet and Haensell, that these little tumors are of a tubercular nature.

According to Machick,⁵⁰⁰ *tuberculosis of the iris* is a rare disease. Of 15,000 patients seen by him, only 2 had tuberculosis of the iris, both dying later of tubercular meningitis. He says that, anatomically, three forms can be differentiated: (1) tuberculous infiltration; (2) disseminated tubercles; (3) conglomerated tubercles. Of 25 cases recorded in literature, 11 died of tubercular meningitis. He recommends removal of the affected part when possible. If not possible, then enucleation is to be performed. If other organs are affected, expectant treatment alone is indicated.

A case illustrating the uncertainty of diagnosticating tubercle of the iris by the symptoms given by Parinaud has been encountered by Gillet de Grandmont.¹⁷³ The patient had syphilis, but the appearance, situation, and other external characteristics of 4 or 5 small tumors of the iris were those of tubercle. A very similar growth, situated in the angle of the iris and accompanied by hypopyon, the result of rheumatic iritis, has also been seen by this author.¹⁷³

Grandclément²¹¹ describes a rare form of iritis, to which he proposes to give the name *uveitic iritis (uveite irienne)*. The posterior pigmented epithelial layer is alone involved, and this only about the pupillary border. The course of the disease is insidious and slow, being characterized by the gradual formation of posterior synechiae and by progressive diminution of vision. Atropine seems to have little power to prevent the formation of fresh synechiae, and the usual constitutional treatment gives no appreciable results in this variety. When the disease has progressed to the formation of a complete synechia, a large iridectomy will usually arrest its course for a time, but has little effect on the impaired vision. When, however, the case is seen before many adherences are formed, Passavant's operation, repeated as necessary, with the use of atropine, will give good results.

In a series of 14 cases of *syphilitic iritis* studied by Roy,¹⁰⁰⁷ all of which occurred in the second stage, and but two presented the eruption of that stage of the disease at the commencement of the eye affections, the author noted that, the severer the eruption, the severer were the iritic symptoms. Ransohoff³⁵³ reports a case of purulent iritis in a girl 4 years old, due, he believed, to con-

genital syphilis. A second attack of iritis was accompanied by neuro-retinitis and the formation of opacities in the vitreous. Liebrecht⁵⁵⁸ has seen a rare case of gummatous iritis, the result of hereditary syphilis, in a female child 7 months old. The anterior chamber was filled by a haemorrhagic exudate, the iris being almost unrecognizable. Iridectomy was performed in each eye for secondary glaucoma. The case exhibited other marked syphilitic lesions. Jocqs¹⁷³ _{July} presents an interesting account of a case of double total posterior synechiæ, the result of untreated syphilitic iritis. From his experience in this case, he advises, in similar conditions, discission of the obstructing membrane, followed by immediate extraction of the lens. He thinks that iridectomy performed after the extraction is an advisable step, as offering a better chance of clearing the field of operation and rendering the almost inevitable secondary cataract less dense. Fridenberg¹⁵⁷ _{Sept.} reports a case of *gonorrhœal irido-choroiditis* in a man 19 years of age. It is of interest to note that the case was complicated by arthritis, which made its appearance after the eye became involved.

Three cases of syphilitic iritis, cured very promptly by subconjunctival injection of corrosive sublimate, are recorded by Secondi.⁵⁸⁹ _{July 11} Paracentesis of the anterior chamber is advocated by Dufour,¹⁴ _{Aug.} as being advantageous in cases of *serous iritis* which show a decided tendency to chronicity, with sympathetic disturbance of the cornea and the aqueous humor. In the treatment of acute iritis, Peuch¹⁷³ speaks highly of paracentesis corneæ as an adjuvant to the ordinary methods, believing it especially valuable in elderly patients, in whom the intra-ocular tension is so apt to be increased in the course of this disease. The operation is followed by rapid temporary contraction of the pupil, an action which he believes to be efficacious in loosening synechiæ that have failed to yield to a mydriatic. After the operation, in the majority of cases, full dilatation is secured and the duration of the disease is generally shortened.

The following operation has been devised by E. Smith⁶¹ _{Sept. 19} for the treatment of *irido-dialysis* from contusion: "A narrow, somewhat slanting incision was made in the cornea, near the sclero-corneal junction, with a broad needle or a very small keratome. Fine forceps are introduced, and the iris, near its detached periphery, is seized and drawn into the wound. A small portion is

drawn through the wound, enough only to insure being held in position by a compress bandage, till healing has taken place. In order to more thoroughly secure its maintenance in the wound, a fine suture may be passed through the conjunctiva at the border of the wound, and the iris stitched thereto. The suture may be removed in forty-eight hours." The author has successfully performed the operation in 4 cases. Critchett²⁰⁶ has devised a small knife designed for dividing tough capsules and pseudomembranes, and for the performance of iridotomy in suitable cases of closed pupil. The author states that it possesses great advantage over the broad-cutting needle and the narrow Graefe knife, "in that it can easily be turned in the anterior chamber without causing laceration of the cornea." Meurer²⁷⁴ has studied an interesting example of *staphyloma of the ciliary body*, and found that the muscle had been completely absorbed, leaving no trace; that the vessels of the ciliary crown had disappeared, giving place to simple connecting spaces; that the zonule was not detached, its fibres being distended and taking part, as did the whole ciliary body, in the general ectasia, while they became elongated and separated from the processes; that the lens was adherent to the iris by its capsule, being kept in place by this adherence, and only a little advanced by the disappearance of the anterior chamber. The author, consequently, is inclined to believe that the description of this condition by von Graefe, made from living specimens, does not really apply to true ciliary staphyloma, but rather to the more frequent intercalary variety. The nature of the "periodic fluxion" in the horse and other domestic animals is discussed at length by Rolland,¹⁷³ who concludes that, in all important respects, this disease presents symptoms identical with those of iritis in man.

DISEASES OF THE LENS.

Bourgeois⁵⁷⁷ gives the notes of a case of *subconjunctival luxation* of the crystalline lens, caused by a blow from the horn of a cow eight months before observation. Rupture of the sclerotic had occurred near the insertion of the internal rectus, at a position diametrically opposite to the point of injury. Irido-dialysis with prolapse through the rent in the sclerotic was also found. The author performed enucleation. Two cases of *dislocation of the lens into the anterior chamber* are reported by Bettman.²⁴⁷ Extraction

was successfully accomplished. Risley¹¹² _{Sept.} reports a case of *traumatic cataract*, caused by the penetration of a piece of steel into the upper inner quadrant of the lens. In order to relieve tension, a broad iridectomy was made over the region of the rent in the anterior capsule. The case progressed favorably, with absorption of the lens. Knaggs⁶ _{Sept. 19} has seen a case of *lenticonus* in a man 65 years of age. The author says that when the cone cannot be made visible by focal illumination the points which will enable a diagnosis to be made are: "1. The oil-globule-like disc. 2. The great difference in refraction between the margin of the lens and the central portion, the latter being always highly myopic. 3. The kaleidoscopic movements of the retinal vessels. 4. The exclusion of conical cornea." Weeks²⁴⁹ _{Apr.} has seen a case of *lenticonus* posterior, in a girl 7 years of age. Examination of the eye with a concave mirror revealed a bright, circular patch, apparently about 4 millimetres in diameter, located between the iris and the fundus in the antero-posterior axis of the globe. Upon careful study of the reflexes, this was found to project beyond the normal curvature of the lens about .05 millimetre. The refraction of the eye through the centre of the lens was myopic about 12 dioptres, and through the periphery there was a hypermetropia of $3\frac{1}{2}$ dioptres. The base of the cone was probably 2.5 millimetres in diameter. At the apex there was a small opacity, possibly the remnants of foetal blood-vessels. The eye had been convergent since infancy. The fellow-eye showed remnants of the foetal pupillary membrane. Another case of this rare condition, in this instance of the anterior variety, in each eye of a girl of 20 years, is recorded by Venneman. ¹⁷¹ _{Mar. Apr.}

From a study of development of *cataract*, Brailey²⁰³⁶ _{v.ii} concludes that, "whereas, the senile *nuclear cataract* is, primarily, a true degenerative senile change, the cortical form of cataract is not of this nature, but is a disease the course of which may be altered by hygienic measures, and probably also by the action of other remedial means." Risley⁷⁶ _{Aug.} concludes that "cataract, although a disease of advanced life, is not necessarily a senile change, but originates in local pathological states involving the nutrition of the eye itself. In the stage of incipiency it is amenable to treatment by such measures as are calculated to remove the pathological conditions upon which it depends; and we are, therefore, justified in giving a

more hopeful prognosis to many persons with commencing cataract. Although the treatment may fail to arrest the progressive degeneration of the lens, the eye, by virtue of the treatment adopted, will be in a better condition to submit to the trials of surgical interference." Magnus³⁵³ describes some peculiar *pathological formations*, of the nature of vesicles on the circumference of the lens, the contents of which, he believes, are fluid, and their origin a secretion or exudation under the lens-capsule. These bodies are transparent, bullet-shaped, and of various sizes; in some instances few, in others many; fibres of the zonule are attached to the apices of some of them. The cut shows their appearance as seen in a case of iris-coloboma, where they appeared as three-cornered

bodies, with their bases turned toward the centre of the lens and their apices toward the equator. The dark spaces separating them are caused by the fact that the bodies project above the surface of the crystalline; hence, the circumference of the lens appears as a broken, wavy line. These formations were discovered in examining many eyes upon which iridectomy had been performed, and also some instances of congenital coloboma of the iris,

VESICULAR FORMATIONS ALONG THE
EDGE OF LENS.
(*Klinische Monatsblätter für Augen-
heilkunde*.)

under a magnifying power of 6 to 8 diameters.

Schnabel's observations³⁵⁴ lead him to divide juvenile cataract into two classes,—those where the predisposition to it already existed in the germ from which the individual was developed, and those which arise as the result of intra- or extra-uterine derangement in an individual developed from a normal germ. When the parents of children with cataracts of the first class also have cataract, the designation "inherited cataract" is warranted. Most of the cases of congenital cataract belong to the second class. The author has never observed capsular cataract (which constitutes almost half of the cataracts seen in children, and is always congenital) in more than a single child in a family. He also knows of no case in which zonular cataract developed in a child whose father or mother had zonular cataract. This form, he believes, is a congenital affection, involving a non-predisposed lens, and



acquired during intra-uterine life. The forms which Schnabel has observed occurring under circumstances leading to the inference that they resulted from an abnormality of the germ are the completely soft, the nuclear, and the punctate varieties.

Mules²⁰³⁶ _{vii} reports a case which he thinks demonstrates that "typical central capsular cataract can be produced by persistent pupillary membrane in cases where corneal perforation has not taken place." He further asserts that "it is so formed in all such cases, and that there is not a tittle of evidence to prove that it can be produced in any other way." A case of heredity in cataract is reported by G. C. Hall.²³⁹ _{May} The father, aged 40 years, presented, in both eyes, mature cataracts with very opaque capsule, while three sons, aged respectively 7, 11, and 18 years, had anterior polar cataracts in various stages of development. Out of a total of 31 descendants to the third generation of a woman having hereditary congenital cataract, reported by Wilson,⁷⁷⁶ _{on} 16 were afflicted with congenital cataract; males and females were represented in almost equal proportions. Three cases of intra-capsular absorption of senile cataract are recorded by Czermak.³⁵³ _{APR} The first patient, a man 64 years old, had lost the sight of his right eye three years previously, but latterly had regained a certain degree of vision. In the lower third of the pupil a yellow-gray body, moving with the iris, was detected. The upper two-thirds of the pupil was dark, but a fine, gray, veil-like membrane, containing whitish-gray spots, could be detected stretching across the space. After atropia the whole outline of the body was shown, and proved to be the shrunken lens-nucleus, while the veil-like membrane was the anterior part of the capsule. The left eye was the seat of an overripe senile cataract. The second case was of similar character, occurring in a woman of 71 years. In the third case, partial absorption of an overripe cataract took place within two months after an iridectomy necessitated by the prompt appearance of acute glaucomatous symptoms following cocaine instillation, preparatory to the extraction of the cataractous lens. In this case the author thinks that a decided predisposition to glaucoma existed. E. Jackson^{9, 18} considers that no patient with cataract has justice done him until evidence of *choroidal disease* has been carefully sought, and, if discovered, met by treatment. He is satisfied that there are a few cases of diffuse clouding of the lens

that, under appropriate treatment, clear up to quite an appreciable degree.

In a paper read before the British Medical Association, Macnamara² says that in cases of *infantile cataract*, whatever its nature, provided there is no special circumstance contra-indicating an operation, the surgeon should proceed to perform the operation of solution as soon as the child had finished teething. He considers iridectomy only a temporary measure at best, believing that the operation does not afford the retina the best chance of developing at that period of life when its growth is most active.

In the discussion following, Robertson,² speaking only of lamellar cataract, says that he would limit the operation of iridectomy to those cases in which the central opacities do not exceed one-third of the diameter of the lens. Where the opacity is more extensive he prefers recourse to discussion, with subsequent extraction through a small corneal incision. He thinks it advisable, where the opacity is extensive, to operate at an early period of life, so as to avoid nystagmus. McHardy² believes it important to decide, before the child is 12 years of age, whether or not removal of the lens is likely to become necessary, as before puberty the risk of glaucoma or undue secondary irritation and inflammation by swollen lens-substance is at a minimum. His method of operating is to cut the lens freely to pieces with a sharp cutting-needle, which, throughout the manipulation is kept rapidly rotating in order to avoid "locking of the needle in the lens-substance" and dragging on the lens-attachments. Atropine is instilled both before and after the operation. The patient is kept absolutely recumbent, no pillow being allowed, as the author believes it important to avoid, as far as possible, displacement of the broken-up, swollen lens-matter, with consequent undue pressure on parts of the iris. From four to fourteen days later, the lens-mass being sufficiently softened to readily escape, evacuation is now favored through a suitably placed corneal incision with the bent broad needle, which, introduced far into the aqueous chamber and, indeed, into the mass of softened lens-substance, is manipulated so as to press back the posterior lip of the wound. As a rule, two-thirds to four-fifths of the softened lens-matter escapes spontaneously over the flat surface of the broad needle. The author has abandoned the use of the suction-tube. It is his belief that when the transparent

zone of lens-matter external to the zone of cataract is not invaded by any striæ of opacity the cataract will not extend. He favors an iridectomy in such cases when, by the use of a mydriatic and a small diaphragm, it is clear that a vision of $\frac{6}{18}$ Snellen may be secured by a well-placed artificial pupil. Toswill ^{Sept. 12}² says that an artificial pupil should never be made when there are even a few striæ in the peripheral parts of the lens. Lawford believes that recent investigations have shown almost conclusively that in zonular or lamellar cataract the nuclear portion of the lens, inclosed by the opaque lamella, is not, as was formerly thought, quite clear and normal in appearance. In a few cases in which the author had made an external iridectomy he has been satisfied with the result. Wray ^{Sept.}⁷⁸ accentuates the following points in the treatment of lamellar cataract: (a) in a large number of cases unioocular operations suit the patient's requirements better than binocular ones; (b) an operation is necessary, at least in one eye, when vision is less than $\frac{6}{18}$, and the patient is a domestic servant; (c) glasses for near vision are unnecessary, except for prolonged use of the eyes.

A case of unioocular *zonular cataract*, possibly congenital, was seen by D'Oench ²⁴⁹ in a boy 8 years of age. An iridectomy was performed, and five years later no change was discoverable in the central opacity. Nuel ¹⁷² asserts that an eye which secretes mucus or muco-pus after an occlusion of forty-eight hours should be considered as very liable to suppurate after an operation; and he, therefore, undertakes an operation only when the eye has successfully stood this test. Haab ²¹⁴ _{Mar. 1} asserts that it is not wise to wait for the complete ripening of a cataract before operating. He believes that many of the so-called unripe cataracts, such as often accompany myopia, can be at once operated upon with favorable results, the factor of success being the complete removal of the lens material. Macnamara ² _{Aug. 1} concludes that there is no special reason why we should not extract an immature cataract, and adds that he would go a step farther and state his convictions that "the results following the extraction of immature cataracts are more favorable, on the whole, than those of fully-formed cataracts, because in the former the lens escapes from the eye with less damage to surrounding structures than it does when a large, hard cataract has to be extracted." He guards this statement to the extent that he considers it necessary, for the successful extraction of an immature

cataract, that a sufficiently large opening should be made in the cornea to allow the lens to pass through it with ease; that an iridectomy be performed, preferably at the time of extraction; and lastly, after rupturing the capsule of the lens, gentle and continued pressure with the curette should be made upon the lower portion of the cornea, the curette following up the lens as it passes outward through the section made in the cornea.

Dimissas¹⁷³ advocates the method of simple *extraction* without the use of the kystitome (Galezowski's operation), for which he gives the following reasons: 1. The knife should replace the kystitome, because the operation is thus shortened, and because a possible source of infection is avoided, the kystitome being an instrument difficult to sterilize. 2. The exit of the lens, following very closely the primary incision, is accomplished easily, and the removal of cortical matter is secured with very little manipulation. Hence, it follows that secondary cataracts are more infrequent. 3. This operation, more than all others, lessens the chances of inflammatory accident, and thus permits of retaining the primary dressings for a longer time than customary by other methods. He secures antisepsis by several careful flushings of the conjunctiva with bichloride (1 to 4000) for two days before the operation. The lachrymal passages are also cleansed with a stronger (1 to 1000) solution. Boric ointment is introduced between the lids at night, and, in addition, one or two instillations of nitrate of silver are made. When there is chronic disease of any of the superficial parts, this preparatory treatment is commenced fifteen or twenty days before operation. Finally, after a calomel purge, the intestinal tract is prepared by the administration of moderate doses of naphthol and salicylate of bismuth.

From his present stand-point, which he has reached after an experience with the various methods of cataract extraction, covering a period of twenty-six years and including 206 operations, Roosa²⁴⁰ concludes "that he prefers simple extraction with a narrow knife, closure of the eye with a bandage, which may be changed every twenty-four hours, if needful for the comfort of the patient, after the first twelve hours." He does not insist upon rigid decubitus. He instils a drop of a 1-to-500 solution of sulphate of eserine after the operation, and deems it very important to get rid of cortical matter, for which purpose he considers Panas's syringe valuable. Foerster's

operation, he thinks, is to be advised in all cases where there is reason to fear that it will be difficult to extract the lens without accident. He recommends the removal of the lens in its capsule, if, after making the section, it is seen that it will escape readily without a capsulotomy. When subsequent capsulotomy is necessary he prefers Galezowski's knife, and Loring's method, with the use of the narrow Graefe knife, when iridotomy is to be done.

Chisolm⁶¹ states that, unless there be especial contra-indication, he removes all simple senile cataracts without iridectomy. He thinks that if the iris shows a tendency to prolapse after the escape of the lens, notwithstanding the instillation of eserine, it is better to remove the protruding portion, and in this way avoid the accidents of iritic hernia during the after-treatment. In opening the capsule, the author believes that it matters little whether the tear is in a triangular or T shape, provided it is made large enough to let the lens out. Cross² gives the records of 61 cases in which extraction without iridectomy was attempted. He is convinced that healing takes place better and more rapidly after simple extraction. The method may be rather more difficult, but it gives a possibility of more perfect results; and it is perhaps best adapted to cataracts that are barely mature, and for patients younger than the average. When the lens has been some time matured and appears rigid and unpliant, especially if the patient is likely to be restless, iridectomy will probably be indicated. Parinaud¹⁷³ advocates extraction without preliminary iridectomy. He believes that the best means of preventing immediate prolapse of the iris consists in the formation of a corneal flap three or four millimetres in height, by incision at the limit of the transparent part of the cornea. If prolapse of the iris occurs and defies reduction, immediate iridectomy should be made. In operations upon restless patients, however, or those affected with asthma, chronic bronchitis, or obesity, he prefers a preliminary iridectomy. Secondary prolapse within twenty-four hours he usually treats by iridectomy.

A case of *hernia of the iris* occurring on the third day *after cataract extraction* without iridectomy is recorded by H. Harlan.²⁴⁹ The prolapse was reduced and good vision resulted. The points of special interest in the case are: "(1) that the corneal wound is not safely healed at the end of three days; (2) that a recent hernia may be safely replaced instead of being clipped off, as is usually done; and

(3) that while it is not advisable to do so, yet a great many more liberties may be taken with eyes after cataract extraction than many of us have been taught to believe." In a clinical lecture, de Wecker¹⁷⁵ reviews the progress of the past twenty-five years in perfecting the *technique of cataract extraction*. He decides in favor of the simple extraction in preference to von Graefe's operation, and believes that his own method of incision is the one best suited to the majority of cases. Murrell⁸¹ states that for the past two years, when possible, he has performed all operations, including cataract extraction and iridectomy, in his office. He expresses the opinion that confinement in bed, the exclusion of light, closely confining both eyes, and any and all personal restraints that bring discomfort, play no important part in the final results, and are both cruel to the patient and useless.

Moulton⁹⁹, finds that observance of the following conditions leads to most perfect results in cataract operation: Early operation, modified linear section with iridectomy, strict antisepsis, limited confinement, absolute non-interference with the eyes for four or five days unless demanded, and careful and restricted diet mostly nitrogenous, for two weeks before and after the operation. J. F. Fulton⁸⁴⁷ reports the results of extraction in a series of 25 cases of immature cataract. The method employed was to make a large corneal incision, with a corresponding division of the capsule. In all cases where the iris remained prolapsed after the lens had been extracted, the anterior chamber and the cavity of the capsule were washed with a 2-per-cent. solution of boric acid. Escrine was used until the anterior chamber was established, when atropine was immediately substituted. In 18 of the cases secondary cataract formed and capsulotomy was performed. C. M. Thomas⁷⁸ attributes the marked improvements in the result obtained in his last series of 50 cases of cataract extraction mainly to the fact that a preliminary iridectomy was performed in all but one instance. He is of the opinion that a preparatory iridectomy renders extraction not only simpler, but safer. Minor²⁴⁹ gives a detailed report of 25 cases of cataract extraction, performed with iridectomy. In 3 full vision was obtained, whilst in 21 vision ranged from two-thirds to one-tenth, the remaining case having light perception, which could have, probably, been increased by a secondary operation.

Wolkow ²¹ _{Apr.} reports that in 225 cataract extractions without iridectomy he has lost 4 eyes, 1 from secondary glaucoma. In 20 cases there was delayed healing; in 88, iritis; in 33, adhesions of the iris. The resulting vision in 221 cases was superior to ²⁰ _{cc.} No secondary cataract occurred in the entire series. Thompson ¹⁰² _{Feb.} believes that, in a majority of cases, the necessity for a secondary operation is the result of the faulty treatment of the capsule, rather than an evidence of unavoidable inflammatory complications. His experience is that the simple inverted-▲ incision is the best, inasmuch as the flaps roll away from the pupillary area and better protect the iris from the remaining corticalis. Graves ⁸⁵⁶ _{Aug.} gives it as his opinion that the success of cataract operation largely depends upon the after-treatment. He places over the closed lids a piece of soft cloth, saturated with bichloride solution, and binds up both eyes. He considers it best to keep the patient in bed for three days, directing him not to turn upon the operated side, and orders that the wristbands of the shirt be pinned to the bed-quilt at night to prevent the patient from rubbing the eyelids. Gifford ¹⁰⁶ _{Sept.} considers preparatory iridectomy, followed after three or four weeks by the extraction, to be safer than simple extraction. He calls attention to the danger of inducing a glaucomatous condition by the use of atropine in cases of recent wound of the lens in adults. He believes that the reason the drug does not do more harm is, that in these cases the iris is generally so congested that it fails to respond to the solutions commonly used: where, from any cause, the desired dilatation is produced, harm is much more apt to result than when no treatment whatever is used. In the event of an inadvertent introduction of von Graefe's knife with the edge below, in the first step of a keratotomy, whether for cataract or iridectomy, Santos-Fernandez ⁷⁸ _{Aug.} offers consolation by stating that he has on more than one occasion remedied this mistake by deliberately twisting the knife into the proper position, and proceeding with the operation in the usual way. No ill effect, he says, followed this manœuvre.

In reply to several criticisms and condemnations of his method of *suture* of the corneal wound after *cataract extraction*, Suarez de Mendoza ¹⁷³ _{Oct.} describes his operation, claiming 30 new successes, 6 of which he quotes in detail. The essential feature of his operation consists in a preliminary incision to a depth of only three-fourths of the corneal thickness, and a passing of the sutures at

this step, before the anterior chamber has been opened, and while the cornea retains its normal consistency and tension. During the later steps, the suture-threads are looped up between the lips of the wound and held out of the way. In all the cases in which he has removed the dressings very early, complete closure of the anterior chamber was found after two to three hours.

Apropos of a recent statement by de Wecker,⁵²⁹ that in 1863 he had insisted that after the opening of the capsule the aqueous humor, if contaminated, finds in the proper substance of the crystalline an appropriate culture medium, Chibret,⁷⁸ quoting from the original article, claims that, while no statement of this sort was made at that time by de Wecker, he himself had made such a suggestion in 1884 to explain why suppurations were more frequent after lens extractions than after simple iridectomy. Millée¹⁷¹ describes a new model of curette for extraction of the lens. It is a slight modification of Snellen's loop. The details are shown in the accompanying figure.



MILLÉE'S CURETTE.
(*Annales d'Oculistique.*)

Knapp²⁴⁹ has had *haemorrhage into the vitreous* follow the extraction of a Morgagnian cataract from a woman 71 years old. Owing to a tendency of the iris to be pushed toward the wound after expulsion of the lens, an iridectomy was performed. This was followed by the appearance of a bead of vitreous in the section. On inspection of the eye one-half hour later, the dressing was found soaked with blood, and a large clot mixed with soft, viscid liquid protruded from the palpebral fissure, and, upon raising the lid, was found lying in the widely-gaping corneal wound. After removal of the clot a solution of bichloride (1 to 1000) was dropped into the conjunctival sac and an antiseptic dressing applied. No suppuration occurred. Microscopic study of the clot removed from the corneal cut showed it to consist of a mass of blood-corpuscles in which vitreous, lens-capsule, and pieces of retina, especially of the pars ciliaris, were imbedded. In reporting the removal of a cataract from a female 26 years old, suffering from *exophthalmic goitre*, Logetschnikow³⁵³ says that he believes

that this disease is not a contra-indication for cataract operation, but that it is a serious complication, rendering the after-treatment more difficult and tending to cause inflammations of the cornea and iris, as in the case reported. Berry²⁰³⁶ gives the notes of an unusual result of cataract extraction. Several hours after the operation, which was attended with considerable loss of vitreous, severe intra-ocular haemorrhage occurred, and was followed by three attacks of epileptic convulsions. Collins⁶ reports 5 cases of cataract extraction exhibiting exceptional and instructive features. The fifth case was one of slowly developing posterior polar cataracts. Iridectomy in the right eye was followed by complete opacification of the lens in three months' time, when extraction was successfully performed. After a lapse of five years, the opacity in the left eye was found to have scarcely progressed.

Döhring⁶⁹ reports very gratifying results from operation upon a case of double congenital cataract in a boy 6 years old. Before operation the child had only light perception, with nystagmus and want of fixation and disassociation of the eye-movements. After operation, good vision was attained, with quick subsidence of the nystagmus and gradual evolution of central fixation, associated eye-movements, and the sense of space. This case, the author thinks, tends to confirm the empirical theory of the origin of the sense of space. Goupillat⁷⁸ calls attention to the fact that in a superior keratotomy the wound lies at the level of the oculo-orbital depression, and that, consequently, a dressing applied over the lower lid exerts pressure upon the globe at a point nearly a centimetre below the cornea, just where pressure, during the operation, favors the delivery of the lens. This pressure by the dressing, he believes, is responsible for many cases of hernia of the iris subsequent to a successful lens extraction. He recommends a light cotton dressing, placed well up under the orbital margin, so as to make the point of greatest pressure directly over the wound. The lashes of the upper lid should be visible below the cotton. In an article on pressure on the globe after cataract extractions, Jackson⁸¹ makes the following recapitulation: "At the completion of a cataract extraction, or other operations involving a corneal section, an equilibrium without tension is established, while the resiliency of the sclero-corneal coat tends to keep the lips of the incision in the best possible apposition. Pressure on the globe can only aid

in fixing it by doing it mechanical violence, and by the ocular movements is transformed into a species of massage; and, whether such pressure be uneven or uniform, it can only tend to cause the relative displacement of the edges of the wound. Therefore, the primary consideration in the application of a dressing, after such an operation, is the avoidance of all pressure."

Having found that the employment of solutions of mercuric chloride (1 to 5000) in conjunction with cocaine, in cataract extraction, was in some cases followed by permanent linear opacities of the cornea, Graefe¹⁷² has modified the technique of the procedure, applying, for only half an hour prior to operation, a moist sublimate dressing to the closed lids. Boric-acid solution is used throughout, the sublimate being employed only at the beginning and at the conclusion of the operation. From the results of experiments made upon dogs, in order to determine whether the parenchymatous keratitis following cataract operation is due to the corrosive sublimate or to the cocaine solution, Mellinger²¹⁴ _{Aug. 1} concludes: 1. That, if any of the sublimate solution (1 to 5000) remains in the anterior chamber, an intense, long-continued, or permanent parenchymatous keratitis ensues; if none remains, only a temporary and light form of parenchymatous keratitis appears. 2. That cocaine alone causes no keratitis, but it makes the epithelium of the cornea more absorbent of any fluid in the anterior chamber, and as, in cataract operations, it diminishes intra-ocular tension, it tends to produce collapse of the cornea, and so give entrance of sublimate solution into the anterior chamber. In his experiments, not only the weak corrosive-sublimate solution (1 to 10,000 to 15,000), but also weak acids and distilled water, caused temporary parenchymatous keratitis; but not a 3-per-cent. boric-acid and a $\frac{1}{2}$ -per-cent. sodium-chloride solution. In the treatment of non-adherent secondary membranous cataract, de Wecker¹⁷³ asserts that discussion is not without danger. He advocates a formal removal of as much of the membrane as can be safely brought to the corneal wound by the pince-cystitome, making this incision, in cases following simple extraction, through the superior vertical radius, while, after the combined operation, the old cicatrix should be chosen. Neuschuler, Jr.,¹⁷³ _{Sept.} calls attention to the fact that *astigmatism* is almost invariably produced by irregularity of the cornea *caused by the healing* after section of that membrane in the opera-

tions of cataract extraction or simple iridectomy. For this reason he expects to find a pre-existing astigmatism increased after operation, or to see a development of this fault where none had existed previously. The addition of appropriate cylinders, he shows, will often greatly improve a vision which, with spherical glasses alone, is only mediocre.

A thoughtful paper by Van Duyse¹⁷¹ considers the causes of *grave choroidal haemorrhages after cataract extraction*. Despite the negative results of his experiments, he thinks it necessary to admit in such cases the existence of vascular lesions in the choroid, —a state of special friability of the vessel-walls which prevents a ready re-adjustment to the sudden change of intra-ocular tension. Vasomotor changes may also play a part in the causation.

DISEASES OF THE CHOROID.

Elschnig²⁵⁴ describes a case of *detachment of the choroid*. Seven years previously the patient, a man of 45, had been examined in Schnabel's clinic, and a diagnosis of retinitis was recorded. At the subsequent observation choroidal detachment was found to have occurred at the site of the previously observed retinitis. Two years later three detachments of the retina were discovered. The eye had become perceptibly smaller and the tension decreased. This case, in the author's opinion, was similar to those recorded by von Graefe, Liebrecht, and Berger, and he thinks ought to be classified as *retino-choroiditis*. A case of detachment of the choroid was seen by Story²⁰³⁶ in a man 27 years of age. The patient gave a history of having been kicked in his right eye twenty years previously, and of having been struck by a stone on the left eye fourteen years later. Ophthalmoscopic examination showed, in the right eye, extensive detachments of the retina and choroid, the most prominent portion being at the outer horizontal and lower vertical meridians. Below and in there was also a balloon-shaped detachment of the retina. In the left eye the vertical meridian of the retina alone was detached, but in the horizontal meridian to the temporal side both retina and choroid were seen with a +12 D. Four months later the retina and choroid in the right eye was detached all around the periphery of the fundus, and in the macular region there was an hemispherical detachment of the retina alone. There was marked perivasculitis, less pronounced

in the left eye. Ten months later there were vitreous opacities in both eyes. The author diagnosed the case as one of serous choroiditis.

Pröbsting²⁵² gives a very full and complete report of 2 cases of *tuberculosis of the uveal tract*, both originating in the choroid. The first occurred in a man 42 years old, who had shortly before been operated on for tuberculosis of the knee-joint. The second instance was in a boy 9 years old, who, when 5 years old, had had pneumonia, and subsequently scarlatina and nephritis. Some dullness was evident over the anterior and lower part of the right lung. The histological conditions present in the two cases are discussed at length. According to Wagenmann²⁶¹ tuberculosis of the choroid is to be distinguished from glioma of the retina by the early appearance of inflammatory symptoms, including iritis,—phenomena which are wanting in this stage in glioma.

In a consideration of the *prognosis and treatment of malignant intra-ocular tumors*, Lagrange¹⁰⁰ states that complete evisceration of the orbit should always be practiced in melanosarcoma of the uveal tract, in embryonal leucosarcoma, and in the great majority of retinal gliomata. Enucleation alone may be done in the early stage of spindle-celled leucosarcomata of the uveal tract and in the rare cases of the glioma "endophyte" of Hirschberg. Twenty-four cases of *sarcoma* of the uveal tract observed in the Göttingen University clinic have been tabulated by Freudenthal,²⁰⁴ for the purpose of forming conclusions as to the more exact prognosis in this disease after operative interference. In view of the proportion of 37½ per cent. of definite cures shown by this author, the prognosis does not seem to be so unfavorable as is generally supposed. It is recommended that operation should be done as early as possible. If no recurrence is noticed within three or four years, the patient is tolerably safe; not absolutely so, however, as was shown by 1 case in which there was recurrence ten years after operation.

Hanau²¹⁴ reports a case of melanosarcoma of the choroid with metastatic deposits, principally in the liver, and also in the mucous membrane of the bladder and duodenum, the thyroid gland, the subserous coat of the small intestine, the mediastinal, mesenteric, and inguinal glands, and the portal and peripancreal glands. The duration of the primary disease was judged to be over five years. Weinbaum²⁰⁴ reports a case of melanotic sarcoma of the

choroid in the second stage of development, for which the eye was enucleated. Death by metastasis to the liver took place thirteen months afterward. The anatomical features are described with great minuteness. Hirschberg and Cirincione¹⁸⁰ Jena, July report a case of melanotic spindle-celled sarcoma of the choroid, removed with the globe from a woman 59 years old. The case is of interest on account of a peculiar pathological condition of the discs, which the authors describe under the title of "Drüsen im Sehnervenkopf." By ophthalmoscopic examination, the disc of one eye appeared red, its border irregular, by reason of the presence of round, shining formations, which lay more or less deeply in the substance of the nerve-head, and extended over its border, invading the choroid. Microscopical examination of the enucleated eye showed that its papilla was excavated, the cup containing a yellow mass, which extended backward along the central artery and formed a ring around it. Further investigations led to the belief that the mass was a deposit of hyaline matter, the exact composition of which remained undetermined, and that this had become secondarily calcified. From the absence of cells, nuclei, and pigment, and from the negative results obtained in applying the customary tests, the authors believe this new formation to consist of amorphous, non-cellular, organic bodies, exhibiting no albuminoid, fatty or amyloid reaction, and resembling most closely elastin.

Griffith² Sept. 12 records a case in which death "from tumor of the liver" occurred two months after removal of an eye for intra-ocular sarcoma. The author gives the after-results of 23 enucleations for choroidal sarcoma. Fourteen (over 60 per cent.) were well at periods varying from three to ten years, 6 died of sarcoma of the liver, and the remaining 3 died, but less certainly from extension of the disease. Local recurrence in the orbit took place in 2 cases (8 per cent.). Dunn³⁷ gives the notes of a case of haemorrhagic sarcoma, in which severe haemorrhage followed the enucleation of the eye. A microscopic examination of the globe showed the vitreous to be filled with disorganized blood-corpuses, amorphous phosphates, and immense cholesterine plates. The choroid showed marked evidences of degeneration, and several fresh haemorrhages could be seen between the choroid and the sclera. The ciliary body and the posterior capsule of the lens were covered with soft, inflammatory products, and the lens was cataractous. The author

comments upon the fact that, notwithstanding the condition of the ciliary body, no ciliary tenderness was present. In explanation of this, he supposes that repeated haemorrhages in this region had destroyed the "nervous supply" in the ciliary body.

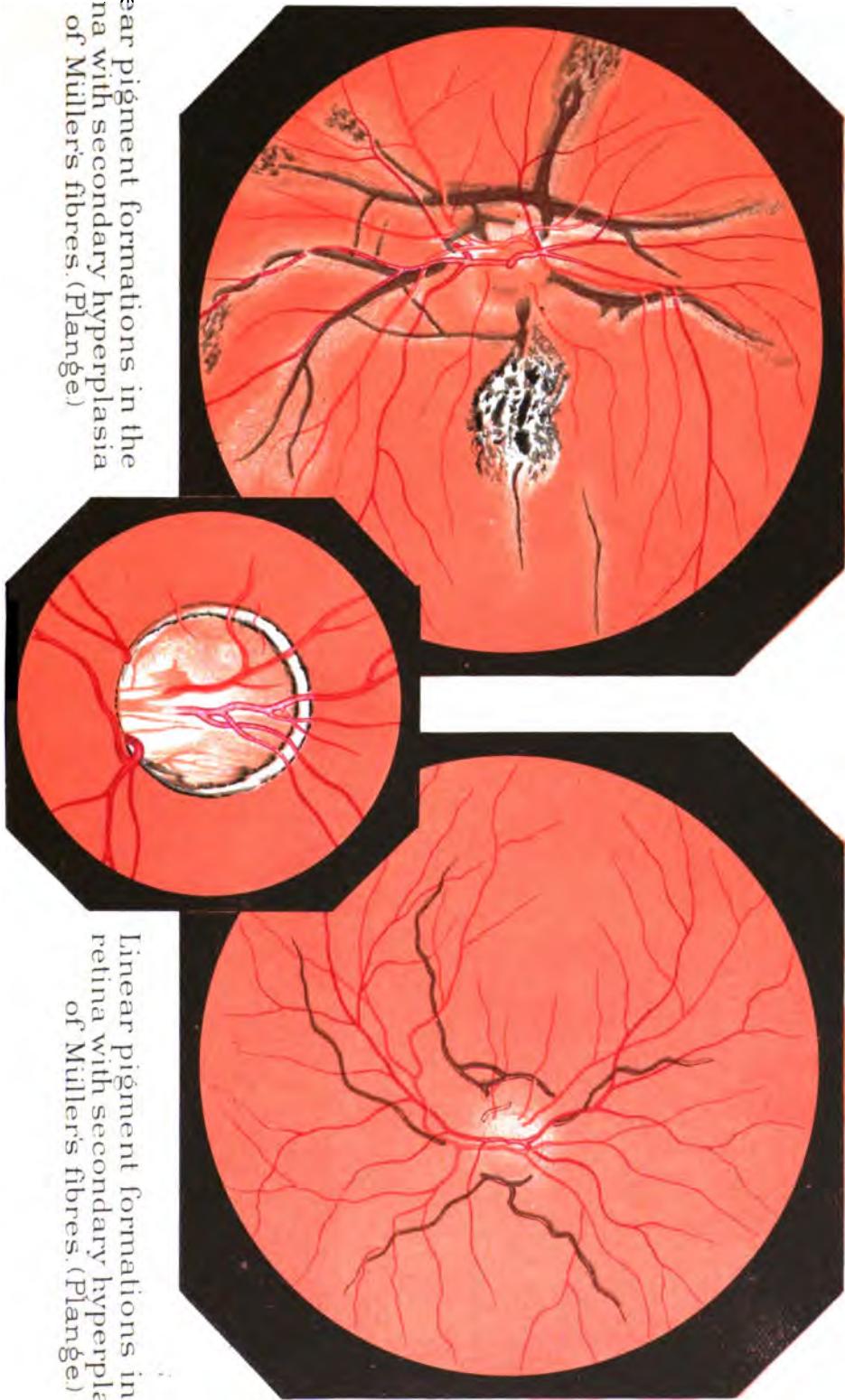
DISEASES OF THE VITREOUS.

Jacoby³⁴, reports a case of *abscess* in the vitreous developing six months after a penetrating wound of the sclera. He believes the suppuration to have been due to microbes, introduced at the time of injury, which remained for a time encapsulated and were subsequently set free. Schutter¹⁹⁰ describes a very curious case of *new vessel formation* in the vitreous of a healthy female patient aged 62 years.

DISEASES OF THE RETINA.

Perles¹⁹⁰ reports 4 cases of *embolism* of branches of the *central artery* of the retina. The most interesting case showed an embolism of the superior macular artery. The patient was a woman of 30, who, probably, had beginning aneurism of the arch of the aorta. The artery was surrounded by an area of retinal oedema, sharply defined from the rest of the fundus and extending from the disc to the fovea centralis. There was a partial central scotoma. In spite of treatment, vision remained unimproved. The author holds that the prognosis as to restoration of vision depends upon whether the embolus has occluded the macular branches or has lodged beyond their origin, and whether by massage it can be pushed farther along toward the periphery of the retina. Lopez¹⁷³ has had the privilege of watching the development of an embolism of the central artery of the retina. The patient was a well-preserved man of 54 years, of good habits and history, without apparent vascular or organic disease. There were interesting prodromal symptoms. He had complained of failure of sight for three years, but this symptom must have been intermittent, for, at the time of the first examination, vision with a + s. 7 D. equalled $\frac{1}{3}$. Central scotoma with defective color-sense and *tremblement des objets* were also complained of. Thirty days later the sight of the right eye was suddenly lost, with all the symptoms of embolism of the central artery of the retina. Fischer⁶⁹, reports a case of embolus, in which vision was almost

Linear pigment formations in the retina with secondary hyperplasia of Müller's fibres. (Plané.)



Coloboma of the Optic nerve. (Plané.)

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completely restored by massage of the eyeball. The embolus had evidently lodged at the division of the central artery and extended into the two main branches. For a while there was a small central scotoma, but with restoration of central and peripheral vision there remained only a relatively small ring-scotoma. In one case of embolism, Inouye²⁴⁹ observed small coal-black spots at the macular region. The author says that "the Japanese are strongly pigmented, and it is probable that the black choroid shone through the thin fovea centralis."

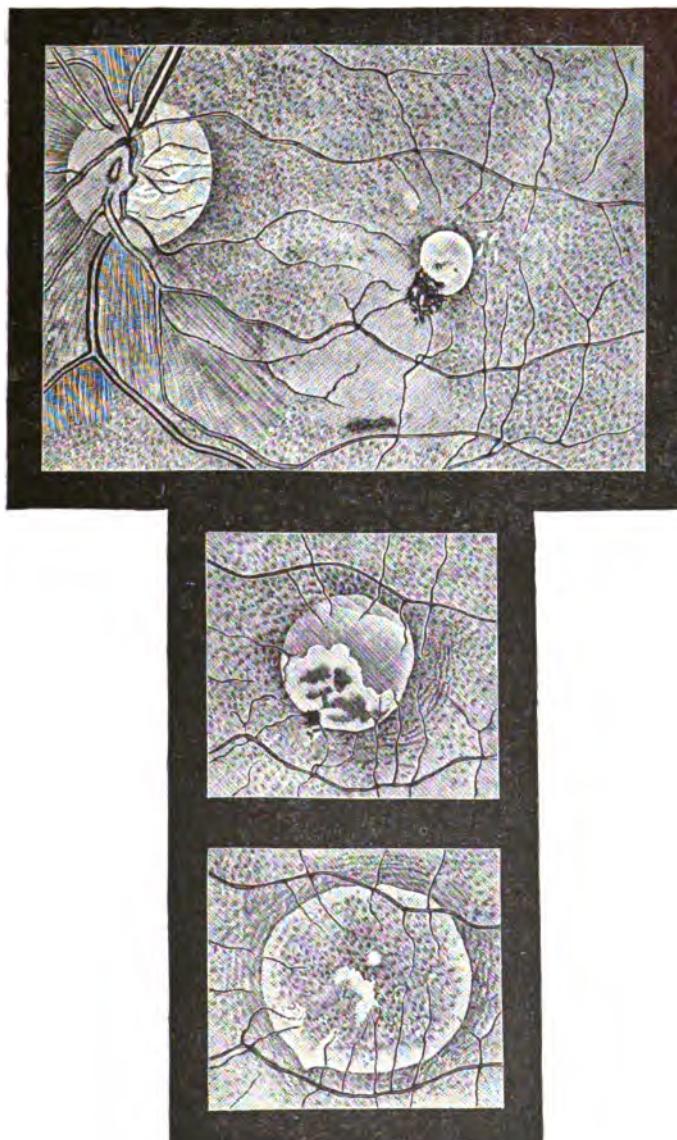
Koenig¹⁷⁸ discusses *thrombosis of the retinal arteries* and details several illustrative cases in which this accident seemed to depend on conditions of the system predisposing to atheromatous disease of the blood-vessels. Valude¹⁰⁰ calls attention to the important fact that *retinal haemorrhages*, especially of the form *en nappe*, may be the first and, at the time, the only symptom of changes in the blood-vessel walls,—changes which, later on, will be indicated by the well-marked symptoms of cardiac or vascular disease. He also believes that the early development of haemorrhagic glaucoma may be heralded by retinal haemorrhages sufficiently early to institute successful prophylactic treatment.

J. T. Thompson⁷⁶ reports a case of large central retinal haemorrhage, which gave rise to a scotoma described by the patient as appearing like a goat's head, with the horns curved back. The perimeter tracing revealed in the right eye a nearly central scotoma, which bore a rough resemblance to a goat's head. To the author "the case seemed to be of interest, as showing that the occurrence of retinal haemorrhages may possibly, in some instances, be responsible for a supposed supernatural appearance." In a case of a man of 55, Lawford²⁰³⁶ describes haemorrhages and exudation into the retina accompanied by unusual alterations in the retinal veins. All the larger veins exhibited very evident dilatation and constriction, a portion being dilated and beaded for a short distance, and then narrowed and even in outline. There was slight hypertrophy of the heart, with accentuation of the second sound at the right base. Plange²⁵⁴ describes a case of *linear pigment formation* in the retina, with secondary hyperplasia of Müller's fibres, the result of changes following haemorrhages. Although these formations showed many points of resemblance to both retinitis striata and retinitis proliferans, yet the author

believes the case to be unique, and states that he could find no analogous instance in literature. The appearance of the fundus is shown in the chromo-lithograph. Horstman⁸⁸ states that in the course of the preceding twelve years he has had the opportunity of keeping under extended observation 19 cases of *detachment of the retina*, in which the condition of the eyes prior to the onset of the morbid affection was also known. All of the eyes but two were myopic. He distinguishes two forms,—the first, exudative, in which there is no laceration of the retina, with a relatively favorable prognosis; and a second, dependent upon shrinking of the vitreous body. In the latter variety the retina is lacerated, the tension of the eyeball is usually diminished, and the detachment becomes complete, with secondary development of cataract and iritis. As to treatment, diaphoresis, a pressure bandage, and the recumbent posture are indicated. Hirschberg¹⁹⁰ asserts that spontaneous cure of myopic detachment of the retina may occur with one of two results: In one case the exudation behind the retina is absorbed and the membrane adheres again to the choroid, but the patient is blind; in the other, the same reparative process takes place, but the patient has apparently permanent restoration of vision. He reports 3 instances with the latter result, the periods of time during which the patients were under observation being eleven years, two and a half years, and one and a half years. Emerson¹ gives the notes of 21 cases treated principally by the combined use of compress bandages and therapeutic measures. The drugs mostly employed were pilocarpine and salicylate of sodium. In 8 of the cases the retina became re-attached and useful vision resulted. Of the remaining 13, 9 were benefited and 3 unimproved, while in 1 the condition was worse after treatment. Pomeroy¹ reports 5 cases, 4 of which were treated by hypodermatic injections of pilocarpine and rest in bed, and 1 by position alone. Three of the 4 cases in which the drug was used were benefited. Liebrecht³⁴ thinks that in Schöler's treatment of detachment of the retina we have the means of procuring a partial and probably a lasting cure. The operation is contra-indicated, he says, in cases of total detachment or where it is flat.

Salzmann³⁵³ reports the observation and removal by operation of a *subretinal cysticercus* in its early development; the diagnosis was made on the first day of observation, which was three days

after the beginning of impaired vision. The parasite had lodged itself in the macular region, and had caused an absolute central



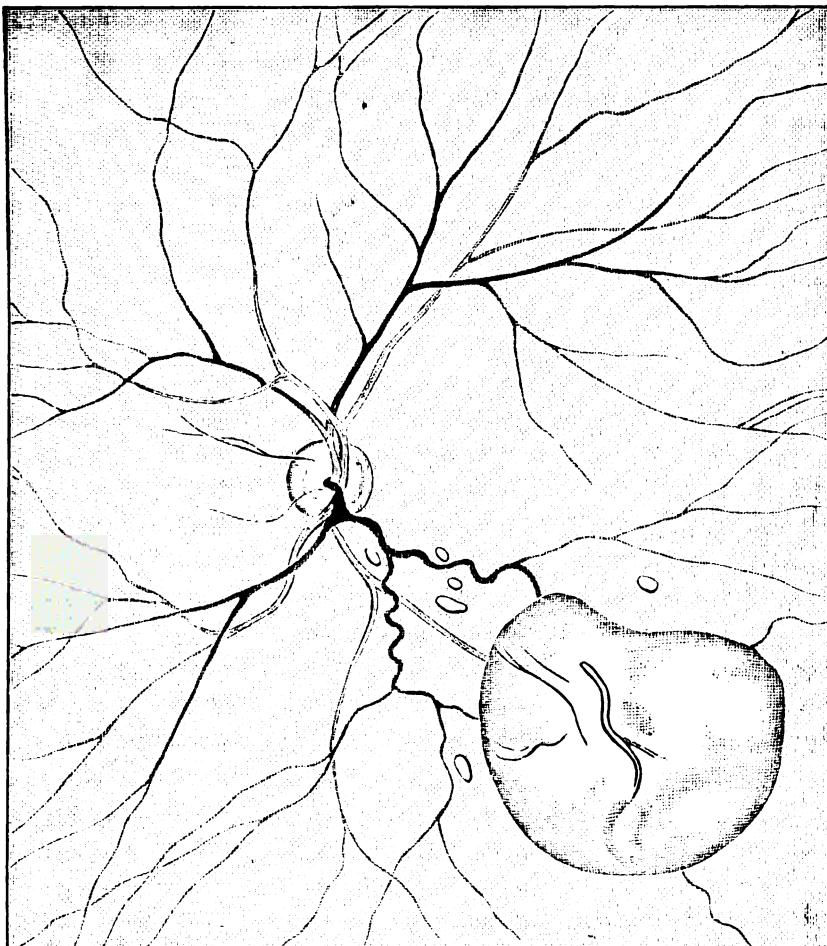
SUBRETINAL CYSTICERCUS.
(*Klinische Monatsblätter für Augenheilkunde.*)

scotoma. The author estimated its size on the first day as one-third the diameter of the disc. On the tenth day it had attained

an actual diameter of 1.5 millimetres, and it was then removed. The histological examination showed that the parasite was in a very early stage of growth, there being only the central cavity with but a rudimentary development of the head and suckers. He agrees with previous writers, that in the majority of cases the mode of entrance is by the choroidal vessels, but in this case he thinks the mode of entrance was by the central artery, since the parasite was early recognized in the extravasation in the area supplied by the smaller retinal vessels. When the embryo lodges itself in the tissue of the choroidal vessels, it does not, owing to their anatomical arrangement, cause the same disturbance of the circulation as it does when in the retina, and hence is not recognized so early. From the changes observed in the ophthalmoscopic appearances, he thinks that the development of the central cavity took place between the second and fourth day of observation, and shortly afterward the rudimentary head was recognized. Perles¹⁹⁰ reports that in Hirschberg's clinic, during the first six months of the year, 5 cases of *glioma of the retina* were observed. Four of these differed in no essential feature from the usual description of such cases; the fifth is of interest by reason of its early observation. The patient was a female infant of 13 months. As shown in the sketch, in the retina of the right eye, inferiorly, and internally to the optic disc, there was a round, sharply-defined tumor, about 6 to 7 millimetres in diameter and 2 to 3 millimetres in height, springing from a short, thick pedicle. This mass varied in tint from milk-white to light blue. The vitreous showed some light-refracting particles, such as are found in this body in the later stages of glioma of the retina. Six months previously the left eye of the patient had been enucleated for a malignant tumor, presumably gliomatous.

Mellinger³³³ describes a case of *retinitis pigmentosa*, in which there were no evidences of choroiditis. The patient, a woman aged 52 years, had had poor vision from the age of 6, when she had an attack of measles, attended with inflammation of both eyes. At the time of observation she had well-marked lesions of pigmentary retinitis, which the author dates from her attack of measles. Tension was increased, and there was a deep pathological excavation. Hemeralopia was first noticed only five years before coming under observation. Vision of the left eye was reduced to two-thirds.

Repeated tests proved that there was no disturbance of color perception, that the light perception was 98 degrees, measured according to Förster, and that the field for red and white was nearly normal. The author attributes the preservation of the visual fields to the existence of tolerably well preserved retinal vessels. Wagen-



GLIOMA OF THE RETINA.
(Centralblatt f. Prakt. Augenheilkunde.)

mann's views²⁰⁴ on the pathological anatomy of retinitis pigmentosa are based upon the micro-anatomical study of an eye presenting this disease. The histological features coincided in detail with those described by Leber. The most-tenable theory, he holds, is that it arises from disorders of the choroidal circulation,—a theory

which is supported by the results of his experiments on dogs, in which obliteration of the choroidal circulation was followed by retinitis pigmentosa. He does not deny, however, that disorders of the retinal circulation may also be causative factors.

Ransohoff³⁵³ found that, among 7 children of a female patient having retinitis pigmentosa, 6 had myopia of high degree, and 1 of these showed the lesions of retinitis pigmentosa; also, that a sister of the patient was "short-sighted" and "could not see well at night," while two of her brothers were highly myopic. Grandclément¹⁷¹ Rev. Des. '90 cites 3 cases of hemeralopia, symptomatic of retinitis pigmentosa, in which subcutaneous injections of antipyrin in the temporal region are said to have cured this annoying symptom, and to have had a distinct power of checking the progress of the retinal changes, and even of restoring or markedly benefiting the failing vision. In one of his patients, a girl of 27 years, who had been affected for ten years, the fields of vision were reduced to a small area about the fixation point, so that she could see only one letter at a time. After 15 injections, practiced on alternate days, central vision was found to be doubled, and the field had increased 3 to 4 degrees about the fixation point. At the time of his report, two years later, the visual field extended to 15 or 20 degrees in every meridian, and the patient was able to read for several hours at a time, and could make her way about the streets. In this case the hemeralopia did not disappear for eighteen months after commencing treatment. The injection should be made deeply, so as to provoke a considerable swelling about the orbit.

DISEASES OF THE OPTIC NERVE.

Deady and Crippen⁷⁷⁶ July, '04 contribute a finely-illustrated study of *retrobulbar neuritis*, which is a careful exposition of the present status of knowledge of this affection. Liebrecht³⁵³ May had a case of retrobulbar neuritis, which was attributed to the habitual use of arsenic. The patient had taken the drug for over three years. Latterly the dose had been increased, producing toxic symptoms of the gastro-intestinal tract.

Risley reports a case of *double optic neuritis* in a woman 25 years of age, who presented evidences of a syphilitic dyscrasia. The patient suffered from epileptiform seizures and motor disturbances, associated with intense pain in the head.

F. W. Ring¹⁹ reports an interesting case of *double optic neuritis*, of malarial origin, in a married woman 55 years of age. Herron¹⁰⁰⁷ describes a case, in a boy 15 years of age, following a blow on the head about two weeks previously. The differential diagnosis between embolism of the central retinal artery and thrombosis of this vessel, or *haemorrhage into the sheath of the optic nerve*, is discussed by Koenig.¹⁷³ Manz⁸⁴ examined an eye removed post-mortem one year after the occurrence of an embolism of the arteria retinæ centralis, and remarked a higher degree of atrophy of the optic nerve than has yet been exhibited in these cases, with a strikingly small amount of retinal atrophy, which was limited to the inner layers.

Believing that in certain cases of diseases of the optic nerve which usually lead to atrophy the degenerative process may be retarded or even prevented by favoring the absorption of infiltrative products, Manolescu⁸⁷ suggests, and has practiced with some success, a massage of the nerve. By means of a centimetre-wide polished-amber spatula, pressed against the border of the lid, which is pressed back into the orbit, he causes slight exophthalmos, and thus a massage and traction upon the nerve is made, which is increased by counter-pressure with the finger upon the globe. He says that the great majority of cases in which he has tried this method showed improvement, generally from the first day of the treatment. Two cases of retinitis pigmentosa of twenty years' duration, he states, evidenced amelioration in central and peripheral vision; while in 10 cases of very advanced atrophy immediate improvement followed.

Peuch¹⁸⁸ has observed monocular exophthalmos and neuroretinitis with complete preservation of the ocular movements, in a boy of 14 years. He attributed the symptoms to a *tumor of the optic nerve*. R. Williams¹⁸⁷ removed the right eye of a child for supposed malignant disease; but, on section, no tumor was found, the globe being filled with a dirty-looking, grumous matter. A few months later, soft, yellowish-white tissue filled the socket, and the opposite eye showed a detachment of the retina with a tumor, presenting all the appearance of a glioma, springing from the optic nerve. Garnier³⁵⁸ gives the clinical history and details the histological aspects of a case of *myxosarcoma* of the optic nerve of a girl of 15 years. He states that sarcoma of the nerve presents a

clinical picture which is strikingly different from that of sarcoma of the choroid by its benignity, rarity of recurrence, painless course, non-metastasis, and its remaining confined to the optic nerve and its adnexa, forming no adhesions to the muscles, and not preventing mobility of the eyeball.

WOUNDS, INJURIES, AND FOREIGN BODIES.

Deleyn¹⁵⁴ saw a cavalryman who received a contusion of the right temporal and frontal regions by being thrown from his horse and striking his face against a tree. Three weeks after the accident, with the subsidence of ecchymosis and swelling, there was paresis affecting the distributions of the facial and the external oculo-motor nerves and the branch of the internal oculo-motor innervating the levator palpebræ superioris of the same side. The lesions were determined to be peripheral, and, under appropriate treatment, the symptoms rapidly subsided. Poulton²⁶⁷ gives the notes of a case where a boy 15 years of age received a gunshot wound that destroyed the eyeball and penetrated the upper wall of the orbit, allowing the brain-substance to escape. During the first month there was active delirium and hemiplegia. Three months later a probe could be passed through the orbit almost to the vault of the cranium; no brain symptoms were present and the patient had returned to work.

Friebis²⁰⁴⁸ May 11 reports an interesting case of *traumatic enophthalmos* resulting in recovery. Two weeks after the injury examination showed a scar about one inch in length above the eyebrow, extending outward from the supra-orbital notch; narrowing of the palpebral fissure; "and the characteristic pocket-like retraction" of the upper lid. There was paresis of the ciliary, occipito-frontalis, internal and inferior rectus muscles. The pupil was large and the iris was sluggish to light, anæsthesia being present over the distribution of the first branch of the fifth nerve. After the administration of potassium iodide for a period of six weeks, all the symptoms disappeared except a slight haze of the vitreous, which subsequently cleared up.

A case of peculiar injury of the eye is reported by Redmond.⁶ Aug. 21 The patient fell with a saucer in her hand, and received a jagged wound immediately under and parallel with the eyebrow. On retraction of the lids the eyeball was found to be hidden from

view by a triangular piece of saucer measuring one and one-eighth inches on each side, the concave surface resting against the eyeball. The wound was enlarged and the foreign body removed. No damage was done to the globe. In a case of *injury to the left supra-orbital nerve*, in a man 21 years of age, Dunn¹ noted the presence of pain, clonic spasm of the lower palpebral fibres of the orbicularis muscle of both eyes, a similar spasm of accommodation on both sides, increased by pressure over the affected nerve, by strong light, near work, and cold wind against the face; diminution of visual acuity; concentric limitation of the field of vision more marked for the left eye; and "more or less" color-blindness. Subcutaneous section of the nerve was performed, and two weeks later all reflex symptoms had disappeared.

Banister¹, reports a case of *marked astigmatism* unmasked by facial injuries, involving the temporo-facial division of the facial nerve and filaments of the same nerve supplying the orbicularis of the right side. After the wound the vision in the right eye was found to equal one-sixth, this being increased to five-fourths by a plus cylinder, 1.25 D., axis 171 degrees. Previous to the accident the patient had very excellent vision in this eye, having used it for sighting in expert rifle-practice; this excellence of vision was regained, after the accident, by the cylindrical correction. Van Rijnberk, corresponding editor in Amsterdam, writes that Straub⁵⁸ reports 2 interesting cases of punctured wound of the orbit caused by bayonet-thrusts, which, he thinks, prove that the shape of the orbit is not well adapted for the protection of the important structures situated in its cavity. Blunt instruments can easily glide down the upper or the side wall and reach and injure the cranial nerves that enter at the apex. Badal¹⁸⁸ has seen an extensive *emphysema* of the lids and conjunctiva follow a blow upon the inferior orbital region, most probably due to fracture of the nasal bone. Bimler²⁴⁸ reports the case of a young soldier who lost his life by a wound from a fencing-foil thrust through the right lower lid. The autopsy showed that the sharp instrument had traversed the orbit without injuring the eye or optic nerve, had fractured the great wing of the sphenoid, torn the middle meningeal artery at the point of entering the cranium, and finally ruptured the Sylvian artery in the fissure of Sylvius.

Hudon gives the notes of a curious case of *complete inclusion*

of an eye, as the result of the faulty healing of an extensive laceration of the cheek and orbit. The wound had been received five months previously, from the horn of an ox, penetrating the cheek and orbit and lacerating the internal rectus and the levator palpebræ superioris, but not injuring the eye. No treatment had been received. The patient asserted that he could see light through the overlying skin. Hingston operated and exposed a normal and functionally active eye. Liebrecht³⁵³ reports a case of *partial section of the optic nerve* by a piece of spectacle-lens driven into the orbit. A small area of the field of vision near the blind spot remained normal, and this enabled the patient to count fingers at a distance of six to seven feet and read Sn. 4. The unsevered fibres were probably the inferior exterior ones, judging by the course of the wound; and, therefore, since the only functionally active part of the retina was seen to be close to the blind spot, the author infers that the most peripheral fibres of the nerve end very near the papilla. The anaemia of the fundus, observed soon after the injury, and the later narrowing of the retinal arteries, indicated that the nerve was cut in front of the entrance of the central artery. This inference, coupled with the existence of functional activity of the undivided fibres, points to the probability that the central artery is not the only source of blood-supply for the optic nerve, and that the peripheral fibres are nourished by the blood-vessels of the pial sheath, which are derived directly from the ophthalmic artery.

In an article upon the treatment of *incised and contused wounds* of the eyeball, Eversbusch³⁵⁴ recommends that, when there is a subconjunctival luxation of the lens, operation for removal should be done early. He describes a case in which, under chloroform, he removed the luxated lens with its capsule without losing any of the vitreous. He claims that this procedure promotes speedier closure of the scleral wound, since, as was true in the case reported, a part of the lens often lies in the wound and prevents union. The essential point of the technique of this operation was that, as the conjunctiva was gradually opened by successive small incisions, the scleral wound was, by corresponding sutures, gradually closed, thus forcing out the lens without any loss of the vitreous. His operation for the cure of scleral ectasia is described in detail. Severe penetrating wounds of cornea, iris,

vitreous, etc., if not infected, will sometimes heal satisfactorily without any other surgical aid than antiseptics. In support of this assertion he cites 2 cases. In all forms of penetrating wounds of the eyeball he has made it a rule, during the past five years, to endeavor to save the globe, except in cases that developed choroiditis or suppurative cyclitis. In such he does immediate enucleation. The results obtained have been very satisfactory. Stoewer ⁶⁹ _{July 22} reports a case of injury of the globe which is interesting from the fact that the sclera was penetrated and the lens and the iris were dislocated without injury to the lids or the cornea, although the site of injury was near to the corneal margin. Spierer ³⁵³ _{June} records the case of a man, 76 years old, who was struck in the eye by a splinter of bone, which penetrated the cornea and the iris and imbedded its point in the lens. The patient refused to have it removed, although submitting to two iridectomies,—the first, for secondary glaucoma; the second, three weeks later, preliminary to the cataract extraction. During these intervals the fragment of bone was noticed to be decreasing in size, and it finally disappeared before the cataract was fit for operation. Richard Fischer ³⁵³ reported the case of a school-boy who accidentally received a punctured wound of the right eye from a pen, which traversed the cornea, the anterior chamber, the iris, and the anterior capsule of the lens. Vision was decreased, but tension was found to be normal. Continued observation also detected folds in the anterior capsule of the lens, that changed position from time to time, until they ultimately disappeared. Under an occlusive dressing, rest, and atropine, recovery is said to have been complete in three weeks. Dimmer ³⁵³ _{Mar.} records the further progress of 2 cases reported in 1889 to the Ophthalmological Faculty of Heidelberg, in which an attempt at artificial cornea was made with transparent celluloid. Vision was restored in both cases. In one the vitreous body remained transparent, and a fistula formed in the cicatrix at the margin of the artificial cornea and refused to yield to treatment. Finally, to avert atrophy of the bulb, the artificial plate was removed. No membrane had formed, and the plate adhered firmly. In the second case a delicate membrane developed, which was removed, and the cicatrix before the margin of the artificial cornea became thinner and thinner and loosened, so that it also had to be removed.

Reboud²⁷⁴ describes an interesting case of extensive *tear of the iris* and *complete detachment of the hyaloid*, with retraction of the entire vitreous without detachment of the retina, the effect of a blow from a chip of wood. The resulting vision was very satisfactory, equalling, with + 12 D., nearly $\frac{1}{2}$. Meighan²¹³ gives the notes of a case in which a chip of steel penetrated the eyeball at the outer sclero-corneal junction and lodged in the fundus below the optic disc. After subsidence of acute symptoms it could be seen lying upon the retina, which was detached. Vision gradually improved until the patient could read Jr., No. 16. The author thinks that this result, with the experience of others in such cases, should cause us to reflect whether we have not been somewhat hasty in advising enucleation, or interfering with the eye to extract the foreign body; and that cases of this kind should be watched and treated for some time before resorting to extreme measures. White² reports a case in which a piece of bell-metal penetrated the eyeball, and for several days, owing to the clearness of the media, could be seen adhering to the nasal portion of the retina, a short distance behind the ciliary processes. Alt³⁴⁷ reports 2 nearly identical cases of perforating injury of the sclerotic, choroid, and retina: one terminating in complete detachment of the retina, the other recovering with a vision of $\frac{1}{4}$. Robertson² had a case of punctured wound of the sclerotic, with penetration of eyelashes into the anterior chamber. The opening, which was nine millimetres in length and three millimetres distant from the cornea, had, projecting from its lips, a bead of vitreous and a loose lash, while two lashes were easily seen in the anterior chamber. The explanation offered by the author for the appearance of the cilia in the anterior chamber is that the wound implicated the extreme angle of the anterior chamber, making a minute channel of communication, that the eyelashes were at first driven into the vitreous humor, and thereafter passed through the narrow aperture into the chamber of the aqueous humor. The lashes were removed through an incision made in the lower part of the cornea. Wall⁵⁰⁸ thinks that atropine should not be used when a foreign body is lodged in the iris, or lying loose in the anterior chamber, because of the danger of having the body fall down behind the iris. Boynton and Crippen⁷⁷⁶ have seen *rupture of the iris and zonule*, with radiating cloudiness of the

anterior and posterior capsule, following a blow upon the eye. Five days after the accident, a small haemorrhage that had occupied the anterior chamber had become absorbed, leaving a few crystals of cholesterin about the line of rupture. The capsular opacities became gradually less distinct, spreading out as dotted opacities. Albertotti, ²⁷⁴ _{Mar. Apr.} has practiced a daily *paracentesis of the cornea* upon a rabbit for thirteen months. The punctures were always made at the same point, midway between the circumference and summit of the outer horizontal meridian. Subsequent examination showed a considerable hyperplasia of the vessels and of the stroma of the connective tissue of the iris. Armaignac, ¹⁸⁸ _{July 19} reports a case of *rupture of the globe* by contrecoup, which is remarkable from the fact that the iris, ciliary body, lens, and part of the vitreous were lost at the time of the accident. The wound healed rapidly and the shape of the organ was preserved. Wolfe ²⁶ gives the notes of 2 cases of profuse intra-ocular haemorrhage following a blow on the eye. In both instances the patients made a good recovery after repeated paracentesis of the anterior chamber; the escape of the clots being assisted by the introduction of a silver probe into the anterior chamber. Williams ⁸² _{Mar. 29} has enucleated an eye containing an *encysted* fragment of guncap surrounded by a large deposit of bone-tissue in the form of a horseshoe.

Hildebrand ²⁵⁴ _{June} publishes the notes of 66 operations, performed in Mayweg's clinic, for the removal of splinters of iron from the interior of the globe by means of the electro-magnet. Of this total the unusually large proportion of 35 operations are reported as successful. In 51 cases the vitreous chamber was the seat of the foreign body, and here the author notes 38 successful removals, with a known permanently good visual result in 16 cases. In most of the operations the "accumulator" magnet was used, being found superior to Hirschberg's on account of its greater power. When the presence of the fragment in the eye is known, and its site determined; or when, in default of exact localization of the body, severe inflammation threatens destruction, the author advises immediate recourse to this operation. When, on the other hand, there is little irritation, while the exact location is not made out, he counsels expectant treatment until exact diagnosis can be made. Gallemaerts ²¹⁹ _{Apr. 22} puts on record a series of 10 observations of wounds of the globe by pieces of iron or steel, in which the accuracy of the findings of

Léon Gerard's apparatus is very strikingly shown. In 7 cases the instrument indicated the presence of the foreign body within the globe, and in 5 of these enucleation confirmed the diagnosis; one of the remaining cases refusing operation, and the other being allowed to retain the eye, which, although plainly containing the foreign body, was free from irritation. Hirschberg's electro-magnet failed in 4 of these cases, one of which was the last mentioned. The 3 cases that gave by the test a negative indication, were consequently submitted to operation for removal of the traumatic cataract by aspiration, and made satisfactory recoveries. Lagrange¹⁸⁸ reports a case of wound of the cornea with prolapse of iris, caused by a flying fragment of steel, which, as afterward was discovered, lodged within the globe. An anterior chamber filled with blood prevented a view of the fundus. A magnetic needle brought close to the eye failed to indicate the presence of the particle of metal. The author discusses the question of diagnosis in such cases, and also the appropriate treatment, favoring, for the latter, exenteration in preference to enucleation. Barck⁸² reports the successful extraction of a fragment of steel from the vitreous by the aid of an electro-magnet. A downward iridectomy was made, and the magnet introduced through the ruptured cataractous lens. Four months later, after a needling operation, vision equalled $\frac{2}{4}0$. Thompson⁶ has successfully removed a fragment of steel from the retina by the aid of a modified Snell electro-magnet. C. A. Wood³⁴⁷ extracted a piece of steel from the vitreous chamber by the same form of magnet, introduced through an incision made in "the sclera, about a centimetre behind the limbus at the lower outer quadrant of the hemisphere."

Meighan²¹⁸ had a case in which the foreign body had been imbedded for eight months in the fundus, just below the optic nerve. Two weeks after removal by the magnet, the eye was still progressing favorably.

In operative cases, and in injuries especially in young children, Prout³⁴⁷ recommends the use, for a few days, of a *suture* passed through the *edges of the eyelids*. This does not prevent the instillation of medicated solutions, and gives the eye the constant support of its natural protector, or splint, the properly curved tarsus, thus keeping the edges of the wound in more accurate apposition than can be otherwise obtained. As a further protec-

tion from injury during the healing process, he employs a wire mask, similar in form to that shown in the accompanying cut.

According to Haab, ²¹⁴_{Feb. 15} all operations on the eye and eyelids, with a few exceptions, can be painlessly done under cocaine anæsthesia. He prefers general anæsthesia in the following operations: Enucleation of a severely inflamed eye, or an eye with adhesions from former inflammations; extirpation of the lachrymal sac, and removal of tumors from the orbit or from the palpebral region. Exenteration, with which he has had no experience, can be done, according to Fodor, ⁶⁵⁰_{No. 50, '94} under cocaine anæsthesia. Although the use of cocaine in eye surgery is not without danger,



PROUT'S PROTECTIVE WIRE MASK.
(*American Journal of Ophthalmology.*)

he believes it can be made tolerably safe by taking care that no more of the drug be used than is absolutely necessary, not more than five centigrammes at a dose, and that the solution be sterile. This last precaution is attained by making the solutions 2 to 5 per cent. in 1-to-5000 sublimate solution, and boiling just before use. In iridectomy and cataract operations he uses the solution in drops; in other operations he also employs hypodermatic injections locally.

An instructive case for the consideration of the advocates of *resection of the optic nerve* is furnished by Troussseau. ⁷⁸_{Mar. 11} For a severe cyclitis in an eye whose sight had been lost, from accidental causes, six years before, the author performed resection, and the

patient was discharged "cured." Two months later, however, the patient returned with sympathetic irritation of the sound eye, for which, after aggravation of the symptoms despite vigorous constitutional treatment for three weeks, enucleation of the exciting eye was performed. The orbit was found to contain some small clots and serous fluid, which, the author is inclined to believe, furnished the new focus of infection. The patient, fortunately, made a good recovery, regaining a vision of one-half. This case illustrates a hitherto unappreciated danger of the new operation. A later communication from Troussseau¹⁷³ states that this patient returned, six weeks after discharge, with a serious attack of plastic iritis with pupillary exudates, which, despite the most vigorous treatment, left the eye with very little vision. While the outcome of the case is unfortunate, the author regards it as a significant proof of the uselessness of resection, and believes that an enucleation performed at once would have secured the patient good vision to-day.

A successful resection for the relief of the pain caused by a hopeless case of irido-cyclitis is detailed by Kalt.²⁰⁰ Fox¹⁹ successfully performed resection in a case of sympathetic inflammation. The sight of the right eye had originally been destroyed by sympathetic inflammation following a punctured wound of the fellow eye, which recovered with good vision. Seventeen years later the blind eye became irritated and caused a sympathetic iritis in the left eye. Two slight attacks of iritis occurred subsequently within three years, and a third and most severe attack about a year later. All these attacks seemed to start from the right eye, which was sensitive to pressure, and irritable. During the last attack, resection of the nerve of the right eye was performed, with an immediate favorable result.

In the presence of *panophthalmitis*, Vénidès²⁴ believes that surgical intervention is always indicated, unless a general bad condition of the patient or a commencing infection of the system offers a contra-indication; that, in adults, enucleation is the operation of choice, while in young children exenteration may be practiced, because of the tendency of the sclerotic at this age to retract; and, finally, that resection of the nerve is inadvisable, because it renders antisepsis more difficult, and thus exposes to the danger of phlegmon of the orbit.

The question of the *etiology of sympathetic ophthalmia* is still

a fertile source of discussion. Boé¹⁷⁸ criticizes the value of Deutschmann's experiments and conclusions, and significantly notes that all the rabbits in which that observer found cocci in the sheath of the optic nerves, after the inoculation of the vitreous with pure cultures of the staphylococcus, had died after a variable period of general systemic infection; and that, under such circumstances, it is not strange that the microbe was found in the neighborhood of the eye as well as in other organs of the body. The conflicting results of Gayet on the one hand, and Randolph, Mazza, Gifford, Limbourg, and Lévy on the other, cause the author to call in question the various new methods of treatment founded upon the microbial theory; and he, therefore, in cases of penetrating wound of the ciliary region, recommends immediate enucleation.

De Wecker¹⁷¹ argues for the restriction of the term "sympathetic ophthalmia" to distinct inflammatory phenomena in the second eye (the migratory ophthalmia of Deutschmann). He affirms the existence of a direct lymphatic connection between the two eyes through the optic nerves and chiasm; and asserts that but one cause can give rise to sympathetic ophthalmia, *i.e.*, infection. His plans of treatment are systematized as follows: 1. In recent injury of the ciliary region, without penetration of the foreign body, but with disappearance of qualitative or even quantitative perception of light, without any hope of re-establishing useful vision,—resection of the optic nerve. 2. In the same injury with penetration of the foreign body,—extraction of the body, followed, after cicatrization, by resection of the nerve. 3. In injury involving the ciliary region, without penetration, and with preservation of good qualitative vision,—deep and thorough cauterization of the wound, with antiseptic dressing (iodol, iodoform, etc.). 4. In the same injury with penetration of the foreign body,—extraction of the body, to be succeeded by resection, if vision markedly declines and irritation persists. 5. In old injury of the ciliary region, with complete loss of vision and sympathetic ophthalmia of the fellow-eye,—resection of the nerve, with prolonged irrigation of the stump with a strong solution of sublimate (1 to 1000 or 1 to 500). If enucleation be performed, he advises subsequent irrigation of the stump until prevented by cicatrization. Abadie's method he thinks of doubtful value, but worthy of trial. 6. In the same condition, but with preservation of vision in the injured eye to the extent that

it balances approximately the present vision of the sympathizing eye or that degree of vision which will be finally attained,—thorough cauterization of the infecting focus and injection according to Abadie's method, with the usual mercurial treatment for the fellow-eye. The author also describes his articulated crotchet and haemostatic scissors for the operation of resection. A later article¹⁷¹ _{Mar.-Apr.} is devoted to the indications for resection of the optic nerve. Abadie¹⁷¹ _{Nov.-Dec., '90} reports 4 new cases of sympathetic ophthalmia cured by his method of injecting corrosive-sublimate solution into the injured eye (see ANNUAL, 1891). A later article¹⁷¹ _{Jan.-Feb.} mentions a case seen by him in which a surgeon had injected half a syringeful of a 1-to-100 bichloride solution beneath the conjunctiva. There had been a very intense reaction, followed by marked but temporary improvement in vision. The author attributes this failure to the excessive strength of the solution employed. Another contribution by the same author¹⁷¹ _{Mar.-Apr.} details a case in which an injured eye was cured of infectious irido-choroiditis, by the use of the galvano-cautery and subconjunctival injections of 1-to-1000 sublimate solution. In this case the previous loss of the fellow-eye rendered any other method of treatment impossible, and hence the result was all the more striking. Schmidt-Rimpler⁶⁹ _{Oct.-Nov.} records a case of sympathetic inflammation occurring a year and a half after optociliary neurotomy of the other eye. The stump was enucleated, but showed nothing but cellular infiltrations of the ciliary nerves. No bacteria were discovered. Under appropriate treatment the affected eye recovered one-half vision. Minney⁸⁰¹ _{Feb.-Mar.} arrives at the following conclusions: (1) Sympathetic disease may develop without the uveal tract being involved; (2) disease of the uveal tract is the most frequent cause of sympathetic inflammation, not because of more frequent injury, but on account of some predisposition; (3) there is a tendency for a sympathetic inflammation to attack not only the same structure in the sympathizing eye, but a point in that eye corresponding to the affected area of the exciting eye; (4) an old stump, whether tender on pressure or not, may excite sympathetic inflammation, and should be removed if the remaining eye is weak; (5) a phthisical eyeball is a dangerous neighbor, and should be removed; (6) an eye containing a foreign body which cannot be removed, as a rule, should be enucleated; (7) if sympathetic inflammation has set in and there is some vision in the exciting

eye, enucleation should not be performed ; (8) if the function of the sympathizing eye is destroyed and there is some vision in the exciting eye and recovery is retarded, the sympathizing eye should be removed ; (9) if a sympathetic eye has had an attack of iridocyclitis, it should be used but little ever after for close work.

Story⁷⁶ formulates the following conclusions in reference to the performance of operations upon eyes blinded by sympathetic ophthalmitis : 1. No operation should be performed on an eye until all signs of sympathetic inflammation have disappeared, except intra-ocular pressure be acutely glaucomatous. 2. If an operation must be performed for glaucoma during active "sympathy," it should be a corneal or scleral incision, and no iridectomy should be attempted. When all inflammation has disappeared, the best method of operating is that of Pritchett, by which the iris is not wounded, haemorrhage is reduced to a minimum, and the least possible occasion is given for inflammatory reaction ; and, lastly, no large opening is made in the globe through which a fluid vitreous may escape, as it does occasionally during an iridectomy, in quantity sufficient to produce collapse of the eyeball. Randolph⁷⁷ had a case in which recurrent attacks of sympathetic ophthalmia occurred over a period of ten years, following a bullet wound which had destroyed the sight of the eye. The fellow-eye presented a superficial keratitis, limited to a small area of the cornea, but appeared otherwise unaffected. The injured eye was enucleated, and the bullet was found behind the globe, just between the angle formed by the junction of the eyeball and the optic nerve, on the temporal side of the latter. No further attacks of sympathetic trouble have occurred. Baxter⁷⁸ reports 4 cases of punctured wounds of the eye occurring in children, 2 of which illustrate the great liability in patients under the age of puberty to develop sympathetic ophthalmitis. Spalding⁷⁹, considers that "the eye of a child less than 10 years of age, with a perforating injury of any sort in any region of the eye, ought to be enucleated at once, by reason of the greater tendency of children to sympathetic ophthalmia." In a careful paper, Braunschweig⁸⁰ discusses the indications for *enucleation and exenteration of the globe*. He claims, as advantages for exenteration, that the chances of infection are diminished to a minimum, that a better and a more movable stump is obtained, and that the operation requires less manual

skill and practice. Schirmer⁶⁹ compares the *staphyloma operation, enucleation, and evisceration*, and emphasizes the importance of the length of time required for a cure to result. From observations upon 10 cases of enucleation, 3 of evisceration, and 2 of staphyloma operation, it appears that, in the first, seven to nine days are required; in the second, from two to three weeks; and in the last, at least four weeks. He relates the case of a man 72 years old, with well-marked corneal staphyloma. As the patient had previously submitted to enucleation of the other eye, it was decided to perform the staphyloma operation. The eye was, unfortunately, lost during the convalescence from the operation by the sudden development of a panophthalmitis, probably originating in infection from an existing paronychia. J. W. Thompson¹⁰⁵ records the enucleation of an eye that had a fragment of steel encysted in it for thirteen years before becoming free and exciting inflammatory reaction.

Morgan²⁴⁹ has successfully introduced *an artificial vitreous humor* into the scleral cavity in 6 cases. In all but 1 the wound was enlarged horizontally by removing two triangular pieces of the conjunctiva and sclerotic, thus making a somewhat diamond-shaped opening. A glass ball was introduced after all haemorrhage had ceased. Moulton⁶¹ has seen relief from reflex cerebral symptoms (consisting of headache, insomnia, and melancholia) follow enucleation of an eye which, as the result of an injury received during childhood, had become shrunken into a small, hard, cicatricial button, tender to the touch. J. W. Park²⁴⁹ records an interesting case of subjective light sensations following enucleation. The patient was a single woman, 33 years of age, who, in consequence of ophthalmia neonatorum, had lost the sight in both eyes, and at the age of 28 had submitted to enucleation of the right eye for a panophthalmitis. The subjective sensations of light and color, which were referred to the interior of the orbit, were manifested three days after the operation, and have continued for five years.

GLAUCOMA.

In an historical *r  sum  *, Snellen⁸⁵⁸ reviews the various theories of pathology and etiology of this affection, inclining to the view that the increased tension of the globe is dependent upon interference with the escape of fluid from the anterior chamber, as a result of adhesions of the iris and cornea at their periphery. The

adhesions are considered secondary to swelling and abnormal relations of the ciliary body, dependent, among other influences, upon eye-strain due to uncorrected refractive and accommodative deficiencies and upon presbyopic changes in the lens. He admits the temporary utility of a large iridectomy, and of gentle myosis, but manifests a preference for sclerotomy, by reason of the subsequent sclerectasis, to which he attaches especial importance.

Some interesting results have been attained by Ulrich⁶⁹, from the induction of *artificial glaucoma* in rabbits, by means of creating a total adherent leucoma. Study of 9 such eyes showed that the iris was sclerosed and the anterior chamber obliterated. The crypts of Fontana were little altered, but the ciliary processes were deeply pigmented, even in albinos, and in several cases the pigment had advanced even into the fibres of the zonule. In some instances the vitreous showed infiltration of leucocytes. The characteristic change was hyperæmia of the ciliary processes, resulting from cicatricial sclerosis of the iris. The author says that in none of these cases of recent glaucoma has he been able to find any grounds to prove the participation of the angle of filtration, the crypts of Fontana, or the *venæ vorticosæ*,—a theory, he observes, which has been established upon the examination of eyes long diseased; and he goes so far as to suggest the possibility that glaucoma may be predominantly a result of circulatory disturbances.

Rheindorfsen⁵⁵³ maintains that neither increased tension alone nor excavation of the disc alone, nor yet both together, justify a *diagnosis* of glaucoma. To complete the clinical picture, evidences of disease in the pupil, in the iris, and in the anterior chamber must be present. He recommends extraction of the lens (whether clear or cloudy), with rupture of the hyaloid membrane: (1) when, following iridectomy, the anterior chamber is not restored, (a) in acute glaucoma, relatively early; (b) in chronic inflammatory and in simple glaucoma, when, in the course of a few weeks or months, vision becomes worse; (2) when, following iridectomy, the anterior chamber is restored, but vision fails; (3) in absolute glaucoma, as a substitute for enucleation. The favorable results of the operation are only to be obtained by a close observation of the technique. The cause of glaucoma does not reside in the lens, but in the lens-zonule diaphragm. He believes that the mere removal of the

lens will result in harm. The hyaloid membrane must be punctured at the same time.

Schweigger²⁵⁴ publishes an elaborate paper on the *clinical aspects* of glaucoma. Cases of so-called glaucoma simplex, he believes, are either glaucoma without any striking symptoms of inflammation, or cases of primary degeneration of the optic nerve, with pre-existing physiological excavations. The diagnosis cannot be made from any one symptom alone, but requires a careful weighing of all the symptoms and conditions of the case. He denies the possibility of basing a diagnosis upon the existence of arterial pulsation alone, and cites cases in confirmation of this assertion. The essential alterations which glaucoma produces are in the disc, and an unerring estimation of the significance of an excavation is attainable only from a knowledge of antecedent appearances of the nerve-head. Glaucoma may exist and cause defects of the visual field, and even blindness, before the existence of any excavation can be detected; and, in the earlier stages, the atrophic color-changes are absent. He classes hydrophthalmos with glaucoma. He prefers iridectomy to sclerotomy, believing the latter an unsafe method, and claiming to have seen retinal haemorrhage follow the latter as well as the former operation. Macnamara² no longer questions that a connection exists between glaucoma and hypermetropic eyeballs with flat corneæ and shallow anterior chambers. He thinks that, in such cases, the glaucomatous symptoms may be prevented by making the patient constantly wear proper glasses, and applying eserine to the eye once or twice a week, if the pupil is inclined to remain dilated or the patient has a tendency to increased intra-ocular tension. Knies⁶⁹ states that simple glaucoma occurs especially in myopes, and is to be distinguished from optic atrophy with excavation by the fact that the color-sense, which is lost in atrophy, is preserved in simple glaucoma. In myopic eyes, when the choroid is drawn over the optic nerve, glaucoma, he states, is not to be distinguished from atrophy. Collins⁷⁶ reports the occurrence of *glaucoma in 2 cases of congenital aniridia*. In the first patient, a man 34 years of age, the right disc was deeply cupped and tension equalled + 1, while the lens contained fine granular opacities and a few vacuoles. The left lens was also cataractous and the intra-ocular tension was increased. The second instance was seen in a woman 22 years of

age. The right cornea had ulcerated and the eye had subsequently become glaucomatous, with the formation of a ciliary staphyloma. Examination by the microscope showed that the filtration angle of the cornea had become blocked by the intimate adhesion to it of the rounded nodule in which the ciliary body terminated. He adds a third case in which glaucoma occurred in an eye with traumatic aniridia. In this case the iris had been torn away at the extreme root, and the ciliary body, which had become much atrophied, was drawn forward and held in contact with the cornea at the periphery by the entangled lens-capsule, thus blocking the filtration angle.

Dabney²²⁴ reports a case in which the instillation of 2 drops of a 4-grains-to-the-ounce solution of atropia in the conjunctival sac of a man 22 years of age, suffering from muco-purulent conjunctivitis, induced symptoms of acute glaucoma. In ten days vision had returned to normal. It is interesting to note that the patient's mother had glaucoma.

Hartridge²³⁶ reports an interesting case of *chronic glaucoma with haemorrhage into the cup*. One week after noting a small haemorrhage in the bottom of the excavation, the patient returned with the excavation entirely filled with blood. Michaelson¹⁹⁰ has seen a case of glaucoma in a woman 40 years old, in which pulsation of the arteries and veins of the retina was readily detected. In the veins the pulsation was confined to the disc, while that of the arteries extended beyond its limits. On several occasions the pulsation in the left eye disappeared entirely or in part, while that in the right persisted with unvarying intensity. With the knowledge of an existing aortic insufficiency, these manifestations were ascribed to a vascular condition, and a suspicion of aortic aneurism arose which was confirmed by careful physical examination. A year and a half subsequently, the patient died; the heart was found to be fatty, the left ventricle dilated, and the aortic valves insufficient. An aneurism occupied the arch of the aorta, involving also the innominate and the origin of the left carotid and sub-clavian. There was wide-spread endarteritis deformans. The author inclines to the view that the changes in the vessels held an important etiological relation to the symptom-complex of glaucoma.

From an analysis of 3 cases of *haemorrhagic glaucoma*, Ran-

dolph ⁶¹ concludes that iridectomy is not contra-indicated in this form of glaucoma, but, on the contrary, does offer temporary and may give lasting relief from suffering, and consequently should always be tried first. He states that it is still further possible to ameliorate the condition of the patient by paracentesis. As to prophylaxis, in its bearing on the other eye, it "simply means sparing the eye all work, and absolute freedom on the part of the patient from mental and bodily fatigue."

De Schweinitz ^{61,10} records a number of perimetric observations on the influence of eserine and iridectomy in chronic glaucoma, for the purpose of illustrating their effect in widening and maintaining the field of vision, and also their occasional entire insufficiency to control the disease. In a case of chronic or simple glaucoma, in which an iridectomy was performed, the author notes that the operation "checked the process and doubled the astigmatism, caused gradual but, nevertheless, distinct improvement in the visual field, with a corresponding improvement in the central vision; and, finally, was the means of a partial restoration of perception in a previously entirely darkened area."

SECTION IV.

MEDICAL OPHTHALMOLOGY.

May ⁶¹ believes that diseases of the eye are too frequently looked upon as due to purely local influences, and become intractable, chronic, and even apparently incurable, when the constitutional factors in their production are lost sight of. Panas ⁶¹ relates an interesting case of *suppuration in an orbital angioma*, declaring itself during an attack of *typhoid fever*. Enucleation of the eye was finally necessitated, and pus was found in the angiomatous tumor. Examination of the pus revealed the presence of the bacillus of Eberth, and, therefore, indicated a spontaneous infection of the angioma by the bacillus of typhoid fever. A case of *double exophthalmos* in a man 20 years of age is attributed by Eales ⁶² to thrombosis of the left cavernous sinus spreading to that of the right,—this existing as a result either of anaemia or local bone diseases.

Vossius ⁶³ mentions the case of a woman, 38 years old, in

whom, in association with severe trigeminal neuralgia, there developed total ophthalmoplegia upon the same side, and complete amaurosis, without any lesions of the fundus being detected. Koenig⁷³ has seen, in a tabetic patient, a periodic *dacryorrhœa*, with increased secretion from the conjunctival glands, usually associated with an attack of lightning pains. The case resembles those reported by Fétré, in 1887, and is explained, in the author's opinion, by vasomotor disturbances.

Schwann⁷⁴ has observed 7 cases of *vaccine pustules* on the margin of the lids. All these cases showed multiple diphtheroid ulceration of the intra-marginal portion of the lid, which had developed from small, superficial pustules, with decided inflammatory symptoms, chemosis, and oedema. In from eight to twelve days the ulcers began to heal, and in from two to three weeks recovery was complete. In 3 instances the course of the disease was complicated by keratitis, which, in 1 case, appeared simply as a superficial marginal infiltration, but in the other 2 was deeper, and was characterized by a peculiar formation of rings. The treatment consisted in iodoform insufflations and an occlusive bandage.

A case of *keratomalacia* of the left eye and *neuroretinitis* of the right eye, occurring in a child of 6½ years, during an attack of *tubercular basilar meningitis*, is reported by Spierer.⁷⁵ The entire cornea of the left eye suppurred and sloughed away, exposing the iris. There were no signs of inflammation, no pain, and no injection of the bulbar conjunctiva. Staphyloma formation was prevented by frequent instillations of eserine. Cicatrization progressed rapidly, and the patient recovered from this attack with light perception in the eye.

Teillais⁷⁶ has seen 3 cases of *corneal opacities* in very young infants. Two of them were congenital, 1 from arrested development, the other from hereditary syphilis. The third was due to a rapid keratitis from contusion by the forceps during delivery. A case of *paralysis of the fifth and sixth nerves*, dependent upon an *infectious phlegmasia* of the base of the cranium, due to ozæna, is reported by Panas.⁷⁷ A case of *reflex blepharospasm*, apparently excited by a *phimosis* with extensive adhesions, is reported by Bell.⁷⁸ Slitting of the prepuce almost immediately relieved the ocular symptom. Plimpton⁷⁹ reports a case in which *suppression*

of the menses gave rise to intense *ciliary neuralgia and photophobia*, which were relieved by "vicarious menstruation from the bowels." The ophthalmoscope showed "congestion of the choroid and retina, with slight paleness of the optic disc." Nieden²⁵³ mentions the case of a primipara, 25 years old, who, early in pregnancy, was annoyed by a profuse secretion of saliva and severe vomiting. At the end of about two months these manifestations were replaced by an *excessive secretion of tears*, though, beyond an enlargement of the lachrymal gland, nothing abnormal could be detected in the lachrymal apparatus. The condition speedily yielded to instillations of a 5-per-cent. solution of cocaine. Bock²⁸³ reports the case of a girl, 15 years old, who, during the first *menstruation*, found it possible to read only the largest letters. The vision, which previously had been normal, was diminished to Snellen $\frac{6}{2}$ and $\frac{6}{8}$, and Jaeger, No. 5, and was not improved by lenses. The visual field was at the same time contracted. With the ophthalmoscope normal conditions were found. After a brief sojourn in the mountains, acuity and field of vision again became normal. Denti⁶⁵⁵ _{July, Aug.} saw a case of marked bilateral contraction of the pupil, with insensibility to light and convergence, and resistance to mydriatic drugs. After the expulsion of a fine specimen of the *tænia solium*, the iris completely regained its functions. Chevallereau¹⁷³ _{Apr.} records the unique case of a gouty patient, of 54 years, who presented, in the anterior elastic lamina and in the proper tissue of each cornea, several opaque foci, connected by anastomosing lines. These opacities were proved to be due to a deposit of urate of soda. Deady⁷⁷⁶ _{Jan.} has seen a case of *spasm of the ciliary muscle*, apparently produced by *rheumatism*. Parinaud¹⁷³ _{July} describes the characteristics of rheumatic neuritis and sclero-choroiditis. Both of these affections may be observed in gouty or rheumatic persons, and may occur as a metastasis of rheumatic inflammation in other parts, or directly under the influence of cold. Two forms are observed,—the acute and the chronic. In the acute form, the disease begins with deep orbital pain, most marked upon movement of the globe in certain directions, and points may be found where pressure elicits pain. Vision rapidly fails, blindness often being complete in four or five days. The visual field is altered, but without regularity. The ophthalmoscope shows simple neuritis or even choked disc. This variety is usually

monocular: when both eyes are affected the attacks occur successively. The result of treatment by salicylates is prompt and often beyond expectation. In the chronic form there is no pain, the progress is slow, and the diagnosis from syphilis is often difficult, being made much more uncertain by the frequency of development of chorioretinitis. Mercury is the drug to be employed. As to the pathology of the affection of the nerve, the author assumes a lesion at the scleral ring, or a transmission of inflammation to the sheaths of the nerve-fibres beyond.

Froelich¹⁹⁷ reports two instances of *alopecia universalis* observed in male adults presenting the sequelæ of *irido-choroiditis*; in one case the ocular disease appearing subsequently to the loss of hair; in the other, preceding it by about a year. In neither case was there any apparent cause for the alopecia. In view of the obscurity surrounding the etiology of *alopecia areata*, the author puts these cases on record, and also raises the question of a possible connection between this dermatosis and certain grave ocular lesions. From a study of cases of spontaneous and recurring *haemorrhage into the eyeball* occurring in young persons, J. Hutchinson⁸⁰⁶ arrives at the following conclusions: (1) that the male sex is far more prone to suffer from them than the female; (2) that the age most liable is that between puberty and early manhood; (3) that the left eye almost always suffers first, and sometimes alone; (4) that when young women are the subjects, it is usually in cases in which menstruation is suspended; (5) that there are usually present other evidences of want of balance of circulation, such as cold extremities, liability to flush, proneness to epistaxis, etc.; (6) that the inheritance of gout, attended as it is by peculiarities in arterial structure, may be a predisposing cause; (7) that the principal exciting cause is undoubtedly variations in arterial tension, in connection with the influence of the sexual system; (8) that the most important means of regulating the arterial tension is the liberal use of aperient medicine.

Panas³ details an interesting case of *double optic neuritis*, in a young man of 29 years, who had been the subject of two attacks of *gonorrhœa*,—the first, four years before observation. This first attack had lasted six months and was of extremely severe type, accompanied by *haematuria* and a generalized *arthritis*. The second, three years later, had confined him to bed for three months

with an aggravated multiple arthritis. The affection of the optic nerve followed an attack of meningitis, superinduced by a sudden chill from entering an ice-house. The author attributes the meningeal inflammation to a condition of general blennorrhagic intoxication, which was excited into virulent activity by the sudden exposure to cold. He calls attention to the analogous frequency of attacks of alcoholic amaurosis after undue exposures to cold. Panas²¹² records several additional cases of suppuration of the eye excited by cold in persons whose blood was poisoned by the organisms of certain infectious diseases—diseases that show a decided tendency to the formation of thrombi and emboli. He calls attention to the unilateral seat of the disease, and the relatively favorable prognosis resting on this fact. Apart from infectious conditions, albuminuria and glycosuria play an important rôle in determining local coagulations.

Impressed by the analogy existing between a chronic inflammatory hyperplasia of the synovial and fibro-cartilaginous structures of the knee-joint and a chronic hyperplastic condition of the cornea, sclera, and vitreous body, Ryerson²¹³ has been induced to employ the same methods of treatment in the latter affections as have been found of value in the former. He has derived the most benefit from this treatment in cases of dense corneal opacities, interstitial deposits, plastic deposits on the lens from iritis, opacities of the vitreous, and in some obstinate cases of scleritis.

A case of *double optic neuritis*, possibly caused by chronic arsenical poisoning, is reported by H. Derby.²¹⁴ The patient, a woman 26 years of age, complained greatly of headache and failing vision. Following the abatement of the neuritis, vision of the left eye continued to fail. Examination of the urine showed traces of arsenic, and this same poison in large amount was found in the wall-paper of a room much occupied by the patient.

Black²¹⁵ reports 4 cases of *toxic amblyopia from alcohol and tobacco* cured by the hypodermatic administration of nitrate of strychnia. The method of treatment was to gradually increase the dose until the physiological effect was obtained, when the amount was reduced and again increased, so as to obtain the physiological action every six or eight days. The use of the toxic agents was prohibited. The nitrate was chosen because it proved less irritating than the sulphate for subcutaneous injections. In

an article on orbital optic neuritis, including alcohol and tobacco amaurosis, Knapp²⁴⁹ details a case of acute retrobulbar neuritis in an apparently healthy man 40 years of age. Total blindness came on during the course of a night. The ophthalmoscope showed a slight degree of congestive neuroretinitis. Eight years later the patient still enjoyed good health, and in the right eye there was an islet of useful vision in and down from fixation, representing an angle of a little over 1 degree. The optic discs had become perfectly white, and the blood-vessels were reduced to two-thirds the normal calibre. Santos-Fernandez¹⁷⁹, discusses the differential diagnosis of alcoholic and tobacco amblyopias. Morrison⁸² is inclined to the opinion that "the early and continuous use of tobacco, moderate though it be, is capable of markedly restricting the field for colors; that this restriction is, up to a certain point, uniform for blue, red, and green, but eventually the latter far outstrips the others, leading in a few cases to almost total extinction of this color; that in the very few instances (3 in a total of 24) the exceptions to the above conclusions could be ascribed to the intermittent use of the drug."

As an example of the influence of *malarial poisoning upon diseases of the eye*, Theobald⁷⁶⁴ cites a case of deep burn of the cornea and conjunctiva which did not yield to local treatment until the internal administration of quinine was begun. There were no symptoms and no history of malaria. Minor's observations⁸⁴⁹ lead him to think that the most frequent malarial manifestation is a form of conjunctivitis, characterized by a low-grade inflammation with a scanty, serous discharge, affecting the palpebral and ocular conjunctiva. There may be associated circumcorneal injection, with spots of denudation of the corneal epithelium. Intra-ocular tension is slightly reduced; severe supra- and infra- orbital pain, with periodic exacerbations, is complained of; and there is, usually, anaesthesia of the conjunctiva.

A case of *hereditary amaurosis* has been seen by Sym⁸⁶ in a man 36 years of age. Eleven years previously his sight failed in a week's time, changing from an ability to read fine print to the present condition of ability to distinguish only large, black letters on a white ground, held in the extreme temporal field. The patient saw before him a light, grayish mist, having the form of a triangle standing on its apex, and, although this did not appear

dense, he was unable, in this area, to perceive even the brightest light. He thought that he saw better in a dim light. The optic discs were perfectly white, but with a decided blue tinge. The vessels were diminished in size, and, excepting a possible slight disturbance of pigment immediately around the discs, there were no other special changes in the fundi. The mother and three sons are blind, presenting precisely the same symptoms, while the father and two sons are not affected. Borthen³⁵³ reports the case of a boy of 14, in whom, toward the close of an attack of *influenza*, an *orbital abscess* developed. Lindner⁸⁴ _{Apr. 18} reports that after the close of the influenza epidemic in Vienna he had several cases of ocular disease which, on account of the severity of the inflammation, must have been caused, partly at least, by influenza bacilli. Four were diseases of the eyelids, accompanied by enormous oedema and chemosis. The fifth was a case of acute dacryo-adenitis, with involvement of the cervical, sublingual, and submaxillary glands. The great majority of cases of dacryo-adenitis which he had observed had been due to infection.

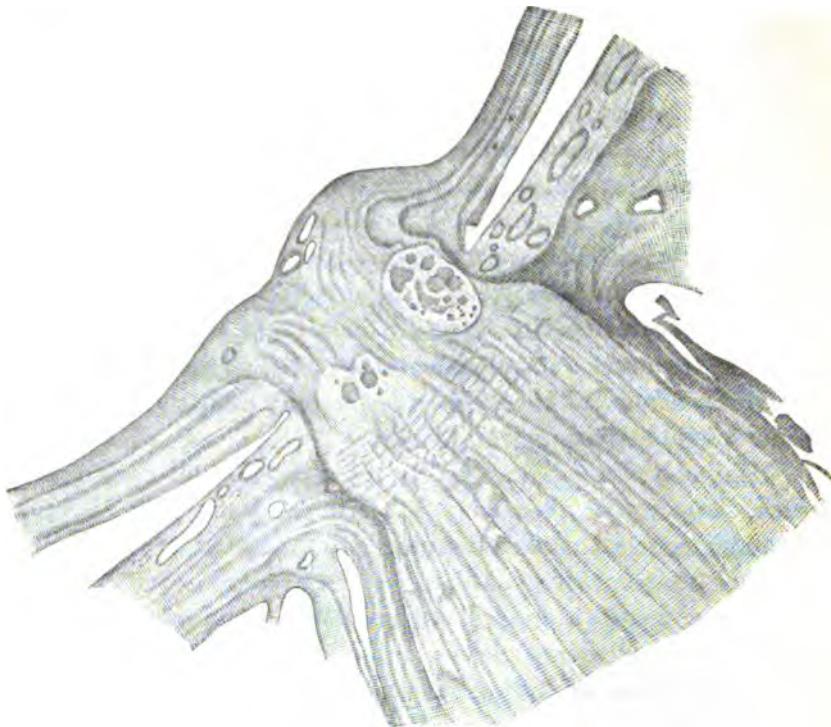
An interesting case of temporary exophthalmos and ophthalmoplegia externa following influenza was seen by Callan.²⁴⁹ _{July} Autopsy showed a circumscribed sac, holding between 3 and 4 drachms (11.25 to 15 grammes) of serous fluid, situated between the dura and pia mater, covering the optic groove, olfactory process, sella turcica, and extending laterally over the sphenoidal fissures. The optic nerves, in their passage into the orbit, were flattened in the foramina, and fluid escaped from the orbits. From a study of influenza in its relation to eye diseases, Stirling²⁵² _{Jan.} infers that the eye symptoms in connection with *la grippe* may arise in one of three ways: (1) as in conjunctival affections, a part and symptom of the primary disease; (2) of embolic origin, as in purulent choroiditis, cellulitis, and possibly neuritis; (3) from the asthenic condition of the patient, e.g., some of the forms of keratitis, one form of glaucoma, and the macular lesions. Dujardin²²⁰ _{Apr. 17} relates a striking case of thrombosis of a retinal vein. The accident was supposed to have occurred during a syncope ushering in a severe attack of influenza. The patient was a man of 53 years, who had evidences of arterio-sclerosis. He died suddenly of cerebral haemorrhage, four days after being seen by the author. The prognosis, in such cases, the author thinks, is grave, not only as regards

sight, but also as to the ultimate consequences of the underlying causal condition.

Weeks,¹ from a study of his own and reported cases of retrobulbar neuritis, publishes the following conclusions: 1. Neuritis of the optic nerve due to *la grippe* is of relatively rare occurrence; it may affect one or both eyes, and may produce partial transient impairment of vision, partial permanent impairment of vision, or absolute permanent blindness. 2. Failure of vision begins from three to fourteen days after the commencement of the attack of *la grippe*, and proceeds quite rapidly. It is always preceded by intense frontal or circumorbital cephalgia. 3. The form of scotoma produced is probably dependent on the position of the neuritis in the course of the nerve from the globe to the chiasm. If immediately behind the globe, the macular fibres are affected; if near the optic foramen, the peripheral fibres suffer first. 4. Treatment has but little effect to promote a cure. If recovery follows, it takes place spontaneously, and accompanies improvement in the patient's general condition. 5. The neurites of motor-nerve branches resemble those that occur after diphtheria, and are mostly of a transient character. They may occur in any or all of the nerve-trunks pertaining to the eye.

Higgins⁶ saw 2 almost intractable cases of ulceration of the cornea, apparently caused by severe attacks of influenza. Lebeau¹⁰⁰⁷ reports a case of temporary double neuritis, occurring in a woman 32 years of age, as a sequel to an attack of *la grippe*. Macnamara² saw 3 male patients and 1 female suffering from double optic neuritis, which came on while they were passing through an attack of influenza. Eperon⁷³ gives the details of 6 cases of retrobulbar neuritis following the epidemic. All were seen rather late in the progress of the disease, and gave little response to treatment. Galezowski¹⁷³ records 2 cases of herpes of the cornea after influenza, which were promptly cured by a collyrium of pyoktanin (1 to 100) and the internal administration of sulphate of quinine. He considers that the principal cause of this disease is a paralytic affection of peripheral (corneal) filaments of the fifth pair. Other cases of the kind he has treated most satisfactorily by applying to the cornea, every three or four days, a thin film of gelatin, in which was incorporated an appropriate antiseptic drug.

Gurwitsch¹⁹⁰ describes hyaline formations in the optic nerve and retina found in a case of *chronic interstitial nephritis*. He believes this to be the only instance on record in which these formations were found in nephritis. Although iodine did not give the characteristic amyloid reaction, he attributes the failure of the test to the prolonged immersion of the eye in Müller's fluid. He believes that these bodies have a local origin, and disagrees with the majority of previous writers, who hold that they arise from the

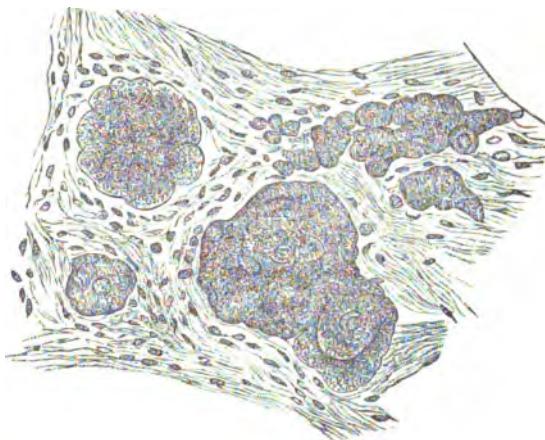


HYALINE FORMATIONS IN THE RETINA.
(Centralblatt f. Prakt. Augenheilkunde.)

lamina vitrea choroidea. The first of the accompanying figures gives a vertical section of the optic nerve and retina, and shows these formations very clearly; while the second is a section of the optic nerve, showing also the infiltration of the latter with round cells. Koenig¹⁷³ Mar., Sept. calls attention to the fact that, during the course of a chronic nephritis, albumen may be absent from the urine for a considerable time, while an albuminuric retinitis may exist in the absence of kidney disease. For this reason he prefers to use the

term "Retinitis of Bright's Disease" (*la retinite brightique*) to signify disease of the retina dependent upon actual disease of the kidney (Bright's). In cases which can be taken as types of interstitial nephritis he finds the existence of a group of symptomatic ocular lesions: ischæmia and sclerosis of the retinal tissue, arterial haemorrhages, degeneration of the arterial walls and diminution of their calibre, produced by chronic contraction and other pathological changes. Foci of fatty degeneration may be observed in some cases of interstitial nephritis, though these are smaller and less numerous than in the other form; but grayish sclerosis of the retina is never found in the parenchymatous variety. On the other hand, in parenchymatous nephritis, the ocular lesions may be said to be a preponderance of foci of fatty degeneration surrounding the macula in the form of a star, more or less diffuse, but large and numerous; haemorrhages, especially venous, caused by retarded circulation from infiltration of the papilla and retina: the veins are large and turgescent in places. The disc is congested and hazy, but the macula is usually healthy. While clinically these two classes of symptoms cannot be sharply differentiated in all cases, the author considers the retinal changes to be sufficiently indicative of the type or the preponderance of one or other of the varieties of Bright's disease.

Martinet⁶⁹ describes a case of *retinitis proliferans* in a patient suffering from chronic Bright's disease and *diabetes mellitus*. He agrees with Manz in his theory of the development of the new tissue formations from chronic retinitis, as opposed to the view of Leber and of Schleich, as noticed last year (see ANNUAL for 1891, vol. iv, B-103). The present case resembles all the other reported cases, except one, in showing retinal and vitreous



HYALINE FORMATIONS IN THE RETINA.
(Centralblatt f. Prakt. Augenheilkunde.)

hæmorrhages, a recent clot being observed in the right eye and the remains of an old clot in the left. Van Fleet,¹ reports 4 cases of "amaurosis or amblyopia nephritica occurring in pregnant women, 1 of whom recovered through nature's efforts, the other 3 perishing,—in 2 instances because of non-interference, in the other because interference was too long deferred."

From a study of 25 cases in which lesions of various character were found in association with *diabetes*, Hirschberg,⁶⁹ distinguishes three groups: (1) a characteristic inflammation of the central region of the retina, with small, bright areas, and frequently, also, small hæmorrhages; (2) retinal hæmorrhages, with the consequent inflammatory and degenerative changes; (3) rarer varieties of retinitis and degeneration, the relation of which to the constitutional disease remains to be demonstrated. The author claims that the appearance of albuminuria during the course of diabetes mellitus does not prove that the changes in the retina are due to nephritis; but that, since diabetes mellitus is sometimes followed by nephritis, and hence by uræmic symptoms, it is not to be wondered at that albuminuric retinitis is found in cases of diabetic retinitis. Of this mixed form he cites 4 cases. On the other hand, Schweigger,⁶⁹ claims to have seen the retinitis described by Hirschberg, without the co-existence of diabetes. He holds that, although all forms of eye disease may occur in diabetes mellitus, there is no retinitis having the same relation to it as retinitis albuminurica to albuminuria, or retinitis syphilitica to syphilis. He does not deny that, in advanced stages of diabetes mellitus in young individuals, there are diabetic cataracts; but, on the other hand, he does not believe that all senile cataracts in diabetics are conditioned by this disease.

Friedenwald²⁴⁹ had a case of retinitis diabetica, in a woman 64 years of age. The ophthalmoscopic examination showed intensely bright white spots arranged around the macula in streaks and lines, "perhaps approaching the stellate figure more than is commonly the case." Other spots of degeneration, less marked and finer in form, were seen farther from the macula, though few reached beyond the papilla. Scattered hæmorrhages could be detected among the white spots, and to the nasal side of the disc. The papilla was quite clear, of normal color, and sharply defined. Seggel³⁴ reviews the various disturbances in the visual

apparatus found in conjunction with diabetes mellitus. A case of retinitis diabetica, in a man 45 years of age, is recorded by G. S. Norton.⁷⁷⁶ The urine contained 2.5 per cent. of glucose. Hirschberg⁶⁹ describes various ocular affections due to diabetes mellitus, and cites data from his practice from 1885 to 1890. Out of 7176 eye patients, 113, or 1½ per cent. were diabetics. After ten years existence, this disease, he says, regularly causes alterations of the eye structures, particularly of the lens and retina. In a third of his cases, diabetes was found associated with some of the following significant changes: (1) uncomplicated paralysis of accommodation in middle life; (2) late myopia occurring between 40 and 60 years, without changes in the lens; (3) retinitis; and (4) quickly developed cataract in young individuals in poor health. Wagner²⁰⁴_{B.M.A.S.} maintains that *ulcus rodens* is a disease *sui generis*, and that it is *not related to syphilis*. In 11 out of 12 cases observed by him, the ulcer was situated upon the lower lid. Treatment, by means of daily applications of a 75-per-cent. solution of acetic acid and subsequent rinsing with water, was followed by good results. Lagrange¹⁸⁸_{Apr. 19} records a case of *nuclear ophthalmoplegia*, of syphilitic origin.

Perlia⁸⁵⁸ discusses the relations of the optic nerve to the *central nervous system*, and shows that it has a well-marked and constant influence upon the functions of the latter. He cites many well-known facts in illustration of this influence upon not only the cortical centres, but also upon the deeper ones. C. S. Bull¹₁₉₀₈ draws the following conclusions in regard to the development of *papillitis* in intra-cranial disease: 1. In cases of cerebral tumor, evidence of descending inflammation may be traced in the sheath or nerve much more commonly than is generally supposed, while in cases of meningitis the evidence of descending inflammation is almost invariable. 2. The resulting papillitis may be slight or may grow intense, but we are ignorant of the causes which bring about this difference. 3. The mechanical congestion in these cases of papillitis does not always result from the compression of the vessels behind the sclerotic ring, but does always follow compression by inflammatory exudation in the papilla. 4. Slow increase of intra-cranial pressure has no effect on the retinal vessels, but a sudden increase of such pressure may intensify a papillitis originating in some other way. 5. Distension of the sheath alone is

probably not sufficient to cause papillitis by its mechanical effect, but may intensify the process otherwise set up.

Snell²⁰³⁶ reports a case of *immediate loss of sight* after severe injury to the back and head with probable fracture of the base at the anterior portion. Directly after the accident the pupils were noted as being rather dilated and the irides irresponsible to light. When the case was examined with the ophthalmoscope, three weeks later, there were no decided signs of whitening of the discs, but later the optic nerves were white. The author says that it is interesting to note that when the injury to the optic nerve has been behind the entrance of the central artery of the retina the atrophy of the optic discs only makes itself evident after the lapse of some weeks. Jessop²⁰³⁸ records 5 cases each exhibiting the Argyll-Robertson pupil symptom in one eye. In all these cases the consensual light reflex was present in the sound eye, but lost, together with the direct pupillary light reflex, in the affected eye. The author believes that these phenomena can be best explained by supposing "a lesion implicating the centre for one side near the endings of the afferent part of the reflex arch," and that this centre is probably situated in the floor of the aqueduct of Sylvius. He, further, believes that the presence of the consensual reflex in the unaffected eye in these cases "strengthens the theory of the decussation of the optico-pupillary fibres." A case of *bilateral ophthalmoplegia and neuro-paralytic ophthalmia* due to *sarcoma of the sphenoid bone*, in a boy 9 years old, is reported by R. T. Williamson.²⁰³⁹ The autopsy showed, in the region of the sella turcica, a large grayish-red tumor, into which the cranial nerves could be traced. The pituitary body was imbedded in the growth. Both bony orbits were invaded, that of the left side being involved in the outer and inner walls, while that of the right was affected on the outer wall only. Major²⁰⁴⁰ gives the notes of a case of *adenoma of the pituitary body*, in an unmarried female 25 years of age, who was under observation for a period of fifteen months. Hysteroid convulsions, flightiness, severe headache, apathy, and almost constant sleep were the prominent symptoms until three months before death, when, for the first time, double optic neuritis, with blindness in the right eye and left temporal hemianopsia, was noted, the nerve-swelling being greater on the right side. Four or five hours before death left ptosis was noticed. The autopsy showed a bi-

lobed flattened tumor, about the size of a "chestnut," projecting from the interpeduncular space. The posterior half of the chiasm was half buried and the right optic tract was slightly displaced outward and partially involved in the growth. Histologically, the details of the structure were similar to those of the normal pituitary body. Oliver¹¹² reports a case of *sarcoma of the genu of the corpus callosum*, in a woman 43 years of age, presenting symptoms of profound hysteria. The want of any gross generalizing pressure symptom at the time of examination, which can be readily understood by the comparatively free position of the tumor mass; the many mental indications of functional neuroses which markedly lessened after proper environment; the changeableness of vision for form and color, and the peculiar psychical condition, all pointed toward some probably temporary changes in the cerebral cortex, characterized by peculiar mental symptoms and sensory changes (hysteria); whilst the one completely obtunded sense (smell), the two more or less so (taste and hearing); the fourth (sight) both weakened and irritated, and the last (touch), which continued paraesthetic almost to the end, gave additional evidence, though allowing the possibility of permanent gross intra-cranial lesion, situated in the anterior base of the brain, to be properly judged by the losses of smell and sight from supposed trunkal pressure on the first and second nerves with involvement of the frontal lobes.

In an article on *hemianopsia*, Noyes⁵⁹ makes the following summary: 1. The want of uniformity in the exact location of the boundary between the blind and seeing portions of the fields in hemianopsia. 2. The continuance of a small central field in each eye, two or three degrees in diameter, in certain cases of double homonymous hemianopsia. 3. Sectorial defects, homonymous in character, are most likely to have origin in the cortex of the occipital lobe, usually in the neighborhood of the cuneus. In these cases there may be absence of other significant symptoms, except, possibly, agraphia, mental blindness, alexia. 4. Sectorial defects may have origin in the subcortical substance of the occipital lobe, but the defective portion of the fields are not likely to be so well defined in boundaries as in 3, and the loss of light-sense will be less complete; there may even be irregular spaces where light is recognized, mingled with blind spaces. In these cases hemi-

plegia, hemianæsthesia, etc., if present, signify proximity of the lesion to the anterior part of the visual radiations of Gratiolet. 5. Sectorial defects, quadrants or other figures, can arise from lesions of the tractus (cases of Marchand and Norris), but will be accompanied by other significant symptoms pointing to the temporal lobes or to the base, such as paralyses or anæsthesiæ, etc. In these cases, as in all cases of tractus lesion, the blind region includes loss of light-, color-, and form- sense. 6. Loss of either color-sense or of form-sense, with preservation of light-sense, implies lesion of the cortex of the visual centre, either direct or indirect. 7. The hemianopic pupillary inaction sign signifies that the lesion is at the middle ganglia of the brain or in front of them, viz., along the tractus, chiasm, or optic nerves. 8. It is certain that a topographical correspondence exists between the cerebral visual centre and the retina, and that it is precise and extends to details. Hun's case proved that the lower part of the cuneus corresponds to the upper part of the opposite halves of the retinae, and Wilbrand's cases corroborate Hun's, and carry the relationship to smaller regions in the respective localities.

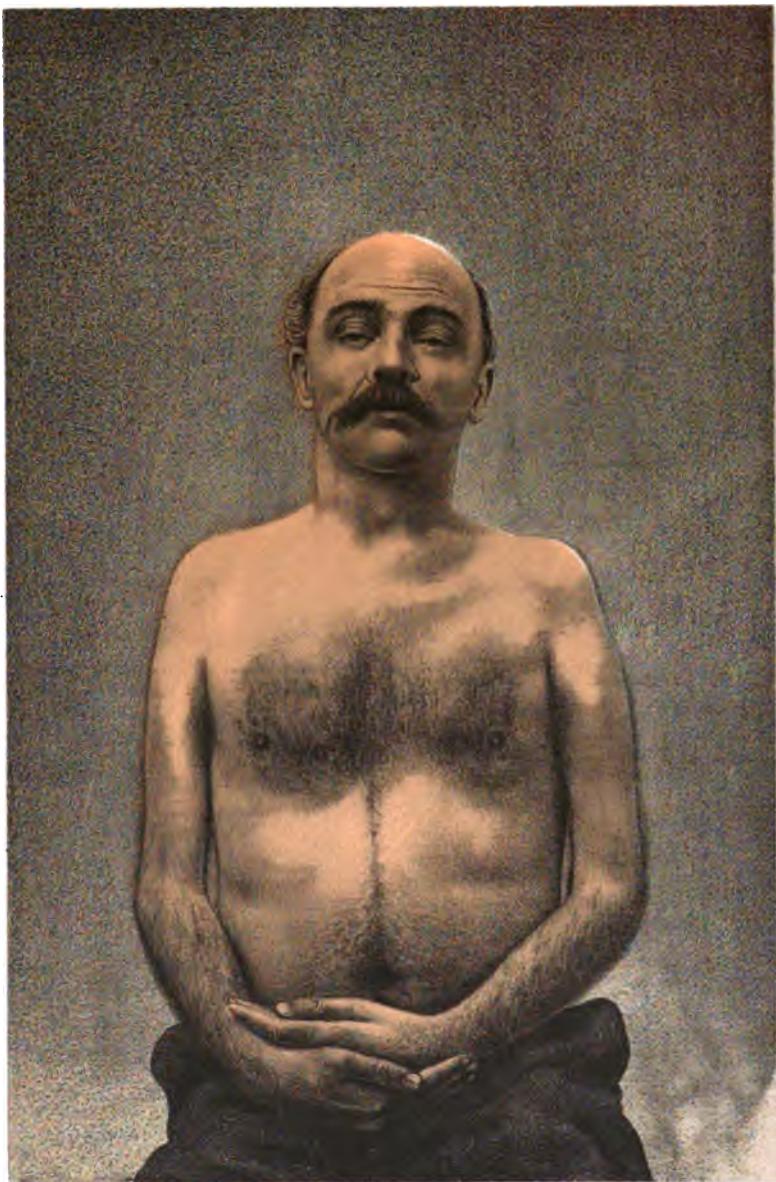
Weeks²¹⁹ reports 2 cases of hemianopsia. The first was seen in a woman 39 years of age, who, nine days after an instrumental labor, became affected with left lateral hemianopsia. The fundus appeared normal. Fifteen months later, after a second instrumental delivery, mind-blindness occurred, followed by temporary word-deafness, amnesic aphasia, and agraphia, the visual field still showing the hemianopsia, with defects in the periphery of the temporal half of the right field. Three months subsequently, examination showed paresis of the muscles of the lower part of the face and tongue of the left side, partial anæsthesia of the left side, and transient hemiplegia. The author thinks it probable that the lesion was an embolism of the posterior cerebral artery on the right side, originating from the puerperal condition. The second case was that of a man 65 years of age, who, during a previous period of fifteen years, had had three attacks of right hemiplegia. There was right homonymous hemianopsia, amnesic aphasia, agraphia, and partial loss of power on the right side, particularly in the upper extremity. The patient died from *la grippe*, and the autopsy showed the left hemisphere to be reduced in size; the island of Reil, the posterior third of the lower frontal and parietal

convolutions, the temporal and occipital lobes, and the cuneus being shrunken largely at the expense of the gray matter. There was a focus of softening, one centimetre in diameter, located in the white substance of the occipital lobe, immediately beneath the cortical layer. The unoccupied portion of the skull was filled with a fluctuating, sub-pial cyst, apparently having its origin at the beginning of the fissure of Sylvius, and filled with reddish serum. The arteries at the base of the brain, especially posteriorly, showed a condition of arterio-fibro-sclerosis.

Story²⁰⁸ _{v.ii} reports a valuable case of temporal hemianopsia of the left and blindness of the right eye in a well-nourished but anæmic-looking girl aged 19 years. The ophthalmoscope showed white atrophy of the right optic nerve. In the left eye there was nothing distinctly abnormal; the inferior temporal artery was somewhat tortuous and the veins were slightly full ("beaded" in appearance). A case of monocular amblyopia, rapidly developing into complete blindness and accompanied in the fellow-eye by temporal hemianopsia with preservation of central vision, is recorded by Boé,²⁰⁹ _{July 6} who attributed the condition to a specific neoplasm involving the optic nerves at the chiasm. Hamilton²¹⁰ _{Aug.} has seen a case of incomplete homonymous hemianopsia in which the right lower quadrants were wanting for form and color. The Argyll-Robertson pupils were present. The patellar reflexes were absent, but there was no loss of co-ordination and no paralytic symptoms. The optic discs were normal. Hill Griffith²¹¹ _{Oct.} saw a woman of 30 years who presented a monocular vertical hemianopsia of sudden onset. The field of the right eye was found to be entirely wanting below a line slanting from the outer extremity of the horizontal meridian to ten degrees below this level at the inner extremity. The fundus showed nothing that was not "perfectly physiological in appearance." "The hemianopic pupillary reflex" was well marked. The patient suffered from migraine. The author thinks, from the suddenness of the onset, that the attack was due to blocking of vessels, most probably in nutrient twigs "from pial sheath," supplying the optic nerve some distance from the eye. Spierer²¹² _{Jan.} reports a case of *right homonymous "hemiamblyopia"* in a woman of 32. The symptoms developed within a few hours in the right eye. The right halves of surrounding objects appeared obscured, as if covered by a black veil.

The patient was not conscious of the same condition in the left eye until she was examined by the author, about two weeks afterward. Monocularly, central vision was good, and no intra-ocular changes were discovered. Because of the absence of paralysis or symptoms of irritation of the other cranial nerves the essential cause was believed to be a slight haemorrhage in the left centre of vision, and not a haemorrhage at the base of the brain. The patient was cured in two months' time. In a second communication on *homonymous hemiopic hallucinations*, Peterson¹ records a case observed by Van Duyn in a woman who, shortly after confinement, suffered from piercing pain in the right temple, associated with disturbance of vision which developed into a left lateral hemianopsia. One week later hallucinations, consisting of animals and children, appeared in the blind area, and continued without variation or interruption for four weeks, when they suddenly disappeared, the hemianopsia continuing. The same author has seen a case of *grand mal*, in a boy 11 years of age, in which the convulsion was preceded by a visual aura of a white star shining to the left. De Schweinitz², reports a case analogous to that described by Peterson. The illusions preceded the hemianopsia and appeared in the fields, which were afterward obliterated. Post-mortem examination showed gummatous infiltrations at the base of the brain pressing upon the right optic tract, in association with more or less oedema of the pia mater and meningitis.

As a result of the analysis of the *sensory changes and conditions of the ocular apparatus as found in imbecility, epilepsy, and general paralysis of the insane*, Oliver³ concludes: "1. In idiopathic epilepsy, as seen in the male adult, the low-grade chronic retinitis and perivasculitis associated with partial red-gray degeneration of the optic nerve, causing decrease of physiological working power, are most probably explained, in part, by the presumption that every convulsive discharge leaves an additional pathological condition, by which such objective intra-ocular appearances are at last established, as the visible, living results of a similar process, which has, *pari passu*, been taking place within the intra-cranial substance, especially the cerebral cortex, and which may be readily seen post-mortem by careful microscopic examination. 2. In the lower grades of imbecility, as seen in the male adult, which have resulted from malformation, or from dis-



External Poliomyelitis with external ophthalmoplegia.
(Guinon and Parmentier)
Nouvelle Iconographie de la Salpêtrière.

ease of a minor degree than that producing so-called idiocy, that has supervened in infancy or has occurred before birth, the ophthalmoscopic findings of abnormally healthy eye-grounds, presenting pictures that are almost identical with those seen during infantile existence, indicate not only an almost absolute perfection of the visible constituents of the observed tissues, which *per se* should be capable of proper functional activity, but plainly show, by reason of mental incapacity which has supervened in such subjects before the eyes have been brought into continued and constant action as instruments of accurate and delicate use, that the ordinary objective conditions, known as dirty, red-gray appearance of the optic disc; irregularity of physiological excavation; non-visibility of the superior and of the inferior portions of the scleral ring; absorbing conuses in all their varieties; increase in density and thickness of the retinal fibres; opacities of vascular lymph-sheaths; disturbed states of the choroid; and gross errors in astigmatism, with changes in indices of refraction,—which are so frequent in the used eye of the mentally healthy,—must be considered as pathological changes expressive of low inflammatory action, with stretching and distortion from increased intra-ocular and extra-ocular pressure. 3. In general paralysis of the insane, as seen in the male, the ophthalmoscopic appearances of the choroid, optic nerve, and retina are not only indicative of pronounced local disturbance and irritation, which represent the results of wear and tear given to a delicate and greatly weakened organ, but are plainly expressive of a degenerate condition of the sensory portion of the ocular apparatus, with impairment of sensory nerve-action, manifested as one of the many peripheral evidences of fast-approaching degeneration and dissolution of nerve elements, most probably connected with related cortex disintegration and tissue death."

Guinon and Parmentier⁴⁵² conclude an extended study of *nuclear exterior ophthalmoplegia* and *polioencephalomyelitis* with the following propositions: 1. Exterior ophthalmoplegia of nuclear origin is comparable, in every respect, to labio-glosso-laryngeal paralysis. As the expression of a systematic alteration limited to the motor nuclei, it well merits the name of *superior bulbar paralysis*, proposed by Charcot, who reserves for labio-glosso-laryngeal palsy the name *inferior bulbar paralysis*. 2.

While curable in certain cases, double paralysis of the exterior muscles of the eye demands a guarded prognosis, which must recognize the possibility of a later appearance of labio-glosso-laryngeal paralysis. 3. Total polioencephalitis, produced by an alteration of the entire motor column of the pons and medulla, begins ordinarily by superior bulbar paralysis,—ophthalmoplegia. The reverse order of appearance is exceptional. 4. Just as labio-glosso-laryngeal paralysis (polioencephalitis inferior) may sometimes complicate muscular atrophy of the Aran-Duchenne type (chronic anterior poliomyelitis), exterior ophthalmoplegia (polioencephalitis superior) may be combined with an amyotrophy, more or less generalized, with a subacute or a slow and progressive course, giving rise to what is called *polioencephalomyelitis*. 5. The absence of sensory symptoms, of paralysis of the bladder or rectum, with the existence of fibrillary contractions in atrophying muscles, and the loss of reflexes,—these characteristics of amyotrophy, combined with the facies of Hutchinson, make clear the diagnosis. 6. Whatever be the form of polioencephalomyelitis, whether acute or chronic, the disease may begin indifferently with ophthalmoplegia or with muscular atrophy. 7. It is an affection of extreme gravity, causing death, or at least making the patient a confirmed invalid. No case of definite cure is on record. The etiology is obscure. Several valuable illustrations accompany these papers, one of which is here reproduced as showing the effects of the supplementary action of the occipito-frontalis in the voluntary effort to overcome ptosis, thus giving rise to the so-called Hutchinson face.

Dufour⁷³ records 3 cases of bilateral nuclear paralysis of the external rectus in patients exhibiting early symptoms of tabes dorsalis. Believing that the great majority of cases of locomotor ataxia are syphilitic in origin, Galezowski⁷⁴ advises that every subject of syphilitic iritis, choroiditis, keratitis, sclerosis, etc., should be treated with mercurial inunctions of $\frac{1}{2}$ drachm (1.94 grammes) daily, for *two consecutive years* (*sic!*), despite the cure of local inflammatory symptoms at the end of a much shorter period. In this way he thinks it possible to prevent later localization of the disease in the brain, with the development of ataxic optic atrophy. C. Zimmerman⁷⁵ records a curious case of *disseminated sclerosis*, presenting the clinical aspect of primary spastic paraplegia, with

atrophy of both optic nerves, occurring in a man 26 years of age, a painter by trade. Debierre⁷⁸ adds a new case of *acromegalia* to the few reported since Paul Marie's description of this disease, in 1885. The case is interesting from the co-existence of bilateral temporal hemianopsia. As all autopsies in this disease so far reported (7 in number) have revealed an exaggerated development of the pituitary body and a marked enlargement of the sella turcica, the author finds it easy to account for the defects in the fields. It is noteworthy, however, that Schultz's was the only case, previously reported, which showed a similar effect from pressure upon fibres of the chiasm. Debierre's case is unique from the co-existence of well-marked symptoms of *tabes dorsalis*. Another marked example of this disease, of thirteen years' duration, has been seen by Pinel-Maisonneuve, ²⁷⁴ July, Aug. who has carefully noted the ocular symptoms. These were exophthalmos, paresis of the extra-ocular muscles and of the iris, and amblyopia from papillary stasis. A curious lack of co-ordination was observed when the patient was directed to look upward, the elevation of the lid taking place much more slowly than that of the globe itself. Color-sense was unaffected, and the visual fields were normal. Cowell²⁰³⁶ v.ii records an interesting case of acromegaly, with atrophy of both optic nerves. Galezowski¹⁷³ _{Feb.} draws the following conclusions in regard to *Parkinson's disease*: 1. Vision remains most often undisturbed. When it is affected, the symptoms are not grave and not progressive. 2. In general, the eyes are fixed, looking forward, and are restricted in movement in all directions. 3. The upper lids are generally drooping, partly covering the globes, which causes the patient with difficulty to see objects above the horizontal line. 4. The lids, notwithstanding, show a slight tremor, often only visible under a magnifying glass; sometimes also the globes show this tremor. 5. Sight is, in general, preserved intact. Only in rare cases is there observed a monocular amblyopia without ophthalmoscopic lesion, associated with contraction of the visual field in three-fourths of its extent. 6. The immobility of the head and eyes, almost habitually present, renders reading and writing difficult. Writing, especially, is interfered with by reason of tremor of the hand.

Liebrecht³⁵³ _{May} has seen a case of *paralysis of convergence* occurring in the course of *Basedow's disease* in a female 67 years

old. At fifteen feet vision was single and muscular balance perfect. At ten inches there was an insufficiency of the interni of 16 degrees, which did not lessen when the prism was taken away. With an abducting prism of about 16 degrees, double vision ceased at that distance. For twelve months the patient had had Basedow's disease, and there was no other pathological condition present to which the paralysis of convergence could be ascribed.

Freund,²⁰ reports a hitherto undescribed form of nystagmus, which he has observed in a case of Basedow's disease, occurring in a man 21 years of age. The oscillations consisted of very rapid, continual, horizontal to-and-fro motions, accompanied by flashing sensations and pain behind the eyes. The movements were so rapid and so small that the eyes seemed to be trembling. When the eyes were sharply converged, the vibrations greatly diminished in intensity; and the same was true when the eyes were turned to the side. In monocular fixation the movements ceased entirely, as was the case when the eyes were closed, the movements beginning as soon as the eyes were opened. Vision of the left eye was normal, while that of the right eye was one-tenth, and central scotoma for red existed. There was also noted intermittent clonic blepharospasm, occurring at intervals of one or two seconds, which ceased when the lids were closed. Under the application of galvanism, the nystagmus soon disappeared, as did the blepharospasm some time later.

Schirmer,²¹ believes that the phenomena of *hemeralopia* have their primary cause in the pigment epithelium; that in light of moderate intensity there are so many pigment-cells in the external limiting membranes that a sufficient number of rays of light cannot get through to cause retinal perception, but that by a sojourn in darkness of from one-half to twelve hours enough of the pigment-cells wander back to leave the rods and cones free, and, in consequence, there is normal retinal perception again. Thus, in hemeralopic eyes, the movements of the pigment-cells are much slower than in normal eyes. The experiments upon which he based his theory were made with 50 cases of symptomatic hemeralopia in cases of choroiditis disseminata, choroiditis centralis ex myopia, chorioretinitis specifica, retinitis pigmentosa, and chronic glaucoma. In all of the cases there was a consider-

able delay in the retinal perception after they had been submitted, in the customary manner, to one-quarter hour's adaptation; but with these same patients there was a steady increase of retinal perception after a longer stay in darkness, and the cases left long enough finally reached normal retinal perception. That is to say, the stage the normal eye could reach after a quarter-hour's adaptation required, for the hemeralopic eye, one-half to twelve hours, averaging two to four hours.

Hennig ⁵⁷ _{Mar. 15, 1922} reports 2 cases of *xanthopsia with hemeralopia and nyctalopia* occurring with icterus. One patient was a girl of 3½ years, affected with hereditary syphilis; the other, a man of 64 years, a chronic alcoholic. The only ophthalmoscopic changes in both cases were an orange-yellow staining of the fundus and a yellowish-red tint of the disc. Touching the etiology of these cases, the author finds it impossible to accept the view of Hirschberg and Landois, that the xanthopsia is due to the imbibition of the bile-pigment by the dioptric media and retina, with consequent extinction of blue and violet rays and modification of the other spectral colors. Hennig believes that the facts lead to the supposition of a central cause and to the existence of a centre for color. If Hirschberg's theory be true, he argues, xanthopsia should be present, to some degree, in every case of icterus, while in reality its occurrence is very rare. By producing an artificial xanthopsia in individuals of normal color-perception, by means of yellow glasses, he finds that, with the exception of a slight diminution of the perception of colors belonging to this part of the spectrum, the color-sense was not affected under varying conditions of light and weather. The other visual defects noted in these cases he attributes to anæmia.

Venneman ⁵² _{May 30} describes an epidemic of hemeralopia observed in the neighborhood of Louvain, in Belgium. Forty-two cases of this peculiar affection came under his own observation, and embraced all classes of people, children being more generally affected than adults. He believes it to have been produced by a species of infectious disease analogous to influenza, having noted as preceding the ocular trouble a sort of febrile condition, characterized by fever and cephalalgia, and lasting two or three days, attacking children in particular. With the appearance of symptoms of hemeralopia, the ophthalmoscopic image showed quite constantly

a slight retinal oedema about the disc, especially along the course of the vessels, with diffuse streaks and markings of black pigment, similar to those observed in a more uniform fashion in certain normal retinas, and not in any way resembling the star-like massings of retinitis pigmentosa. With the return of normal vision these appearances gradually vanished. A number of these patients at the same time suffered from a conjunctival catarrh. No results were obtained from examinations of the blood, and in none of the cases did xerosis of the conjunctiva occur.

Badal¹⁸⁸ records an interesting case of *psychic amaurosis* of eight years' duration, which developed immediately after a wound of the cornea and sclerotic in the ciliary region. The patient, a man 47 years old, presented himself on account of almost constant pain and irritability of the injured eye, persisting since the accident. The pain radiated over all of the corresponding side of the head, with frequent exacerbations resembling the crises of irritative glaucoma. Vomiting and vertigo often occurred. Beyond an anterior synechia at the old scar, with deformity of the pupil, the examination revealed no intra-ocular lesion. There was a slight increase of tension, but no ciliary tenderness. Movement of the hand at several centimetres' distance could be scarcely distinguished. Avulsion of the external nasal nerve was practiced. The day after operation vision was found to be equal to $\frac{1}{6}$, which, by correction of an irregular astigmatism by a stenopalic slit, was brought up to $\frac{1}{3}$. Pain was at once relieved and the visual field was found to be normal in extent.

According to Gilles de la Tourette,¹⁷¹ "*hemiopia*" may accompany *ophthalmic migraine of hysterical origin*, but in these cases it is always transitory, as is the migraine, and appears to be due to a temporary exaggeration of the concentric narrowing of the visual field.

Diller²⁴² had a case of right lateral homonymous hemianopsia coming on suddenly during a great mental excitement in a woman aged 53 years. Falkenheim⁸⁹ reports a unilateral left amblyopia from fright in a child 15 years old, without change in the fundus. Recovery took place in two weeks. The author calls attention to the unilateral character of the defect, which he proceeds to explain by the peculiar circumstances of the fright. A butcher had seized the boy by the throat with his left hand, and,



Ophthalmic megrim. (Babinsky.)
Archives de Neurologie.



with the right, brandished a bloody knife before his face. The author suggests two possible explanations: either that the thumb of the man had irritated the sympathetic nerve or a branch of it on the left side, or, secondly, that a particularly strong impression was made upon the visual field of the left eye.

Babinski⁹⁴₁₈₈₉₋₉₀ cites the histories of 4 cases of *ophthalmic migraine*, which he believes clearly showed their dependence upon a hysterical neurosis. The brilliant scintillating scotoma observed by one of his patients is here reproduced from the sketch made by the subject himself. It resembles, in general form, the scotoma described by one of Javal's patients last year (see ANNUAL, 1891), but is of more brilliant coloring.

Gartenmeister³⁶⁶₁₈₈₁₋₁₈₈₂ narrates the case of a boy 13 years old, in whom, following a severe fright, there developed transitory concentric limitation of the field of vision of the left eye, without any evidence of organic lesion. The corresponding pupil appeared larger than its fellow, but both reacted to light and convergence. There was no limitation in the movement of the eyeball, while the visual acuity of the left eye, which was diminished, was improved by a plane glass. At the end of two weeks the pupils were equal and the acuity of vision was fully restored.

Raymond and Koenig¹⁷¹₁₈₈₉ have observed, in a male hysterical patient, a complete *external ophthalmoplegia* manifested only during voluntary attempts at motion. Unconscious mobility was preserved. This disassociation of voluntary and involuntary movements was also noted in the muscles of the tongue, neck, and arms. These phenomena are attributed by the authors to a functional disturbance of the psycho-motor centres.

De Lapersonne¹⁷₁₈₈₈ reports an interesting case of *hysterical strabismus*, in a girl of 14 years, and discusses the question of differential diagnosis. He believes hypermetropia to be a predisposing cause, and considers hypnotism, as a therapeutic means, but very rarely justifiable.

Dunn²⁴⁹₁₈₈₈ has seen a case of hysteroid convulsions, in a mulatto girl aged 19 years, coming on eight hours after removal of an eye. The author attributed the seizure to the emotional effect produced on the patient by the knowledge of consequent disfigurement.

SECTION V.

THERAPEUTICS AND INSTRUMENTS.

In an interesting article on the interpretation of the *action of drugs upon the ciliary body and iris*, H. O. Thomas²² contends that the dilatation of the pupil caused by belladonna arises from stimulation of the sympathetic. His opinion as to the action of hyoscyamus is that it is a sedative, and as an inhibitor dilates the pupil by its primary ascending action on the cord and brain, affecting the sympathetic by extension. He further claims that morphia and physostigmine contract the pupil by inhibition of the sympathetic.

Mannheim¹⁶⁹ has collected all the cases reported as manifesting symptoms after the use of cocaine in ophthalmic therapeutics. He finds no case of death, but 15 instances in which there were serious after-effects, and the patients were sick longer than twenty-four hours. In 1 of these, a 2-per-cent. solution caused great dyspnoea; in another, great cerebral excitement, staggering gait, and apparent paralysis of the tongue. In 9 cases there were toxic effects without serious consequences. In addition to these evidences of constitutional disturbance, the author found recorded 2 cases of cocaine conjunctivitis, and also, attributed to it, cases of neuralgic pain over the eyes, parenchymatous infiltration of the cornea with loss of substance, and even panophthalmitis.

Leiblinger⁸⁴ describes the hygienic and therapeutic treatment of the eyes with *medicated soaps*,—a subject which he has been investigating for several years. He prefers Sarg's glycerin soap as the base for the others, and recommends their employment as a prophylactic in epidemic or contagious eye diseases and in ophthalmia neonatorum; also for the removal of epidermoidal accumulations on sound eyes, and for the treatment of *xerophthalmos squamosus*.

In the treatment of *corneal opacities*, Cooke¹⁸⁶ recommends the administration of 10 drops of a 1-per-cent. solution of *cannabis sativa* four times daily, alternating with $\frac{1}{100}$ -grain doses (0.00065 gramme) of sulphur night and morning, if the effect of the former drug seems to be lessening. Darier¹⁷³ speaks very favorably of the *subconjunctival injection of corrosive sublimate*, in dose of $\frac{1}{20}$ milligramme ($\frac{1}{1200}$ grain), in all cases of "supposed infectious"

ocular disease in which a prompt control of the morbid condition is of supreme importance. Syphilitic and other forms of acute iritis, gumma of the iris, corneal infiltrations of the same nature, and certain diseases of the inner coats, such as central chorio-retinitis, choroiditis, and neuritis, are said to yield rapidly to this treatment, four or five injections at intervals of three days usually sufficing to produce a complete or relative cure. In such conditions Pflüger¹⁷³ proposes to substitute *trichloride of iodine* (1 to 2000), dissolved in a physiological solution of chloride of sodium, which, he believes, is better supported by the eye. He makes his injections beneath the conjunctiva or Tenon's capsule.

Abadie¹⁷³ confirms these favorable reports, and, for his own part, reiterates the value of his method of intra-ocular injection of sublimate,—not only, as first proposed, in treating sympathetic ophthalmia, but also in rebellious syphilitic cases. He has also had satisfaction in the intra-ocular injection of ergotinine in combating the excruciating pain of hæmorrhagic glaucoma. Schmidt-Rimpler¹⁷⁴ earnestly recommends the use of *aqua chlorata* (German Pharmacopœia) as a disinfectant and antiseptic in all eye operations and injuries. He has used it for over a year, and claims that it is superior to any other germicide. In 125 cataract extractions in which it was employed, suppuration occurred in 1 case only, and this secondarily from accidental causes. He saw no permanent parenchymatous keratitis among these cases, a result which is not uncommon when sublimate solution is used. He maintains that the two possible objections to this agent—its irritating property and its unstable nature—are groundless. He has used the drug undiluted, and has not found it irritating to the wound or to the conjunctiva, although it causes a temporary smarting. In addition, he has found that this agent possesses decided hæmostatic properties.

In the treatment of such chronic conditions as trachoma, pannus, and corneal ulcer, Barr¹⁷⁵ commends the use of an *ointment of iodoform*, 1 to 5 grains to the ounce of vaselin (0.065 to 0.32 gramme to 31 grammes), according to the amount of stimulation desired.

In a paper on the "Indications and Contra-Indications of Heat and Cold in Ophthalmic Practice," Truc¹⁷⁶ reaches the following conclusion: When suppuration is threatened, or in case

of pain after operation, cold is indicated; while in all other conditions (in all blepharitic, lachrymal, and conjunctival affections, in keratites, and especially irites) heat, preferably moist, should be chosen. In an experimental study of the *comparative effect of atropia and homatropia*, Starkey⁶¹ found that in 56 per cent. of the cases there was no difference in effect produced by the two drugs; that in 8 per cent. the use of atropia showed a diminution of refraction, without further change by longer continuance of atropia; that in 12 per cent. the use of atropia for twenty-four hours showed no change from the relaxation produced by homatropia, but changes developed by longer use of atropia; that in 16 per cent. there was a change in the result obtained with homatropia after the use of atropia for twenty-four hours, and an additional change after its continued use. C. A. Wood³⁴⁷ has had manufactured discs containing $\frac{1}{10}$ grain (0.0013 gramme) each of homatropine and cocaine. He claims that they are absolutely non-irritant, and immediately become soft and pliable when placed upon the ocular conjunctiva, to which they readily attach themselves and remain *in situ* until they are entirely (and slowly) dissolved by the lachrymal secretion. R. Thompson²⁸⁷ records 6 instances of *atropine poisoning* in children, resulting from the instillation of the drug into the conjunctival sac. The cases were seen in a period of moist and oppressive weather, during the latter months of summer, in Australia.

Alexander¹⁹⁰ describes his experiments with *tuberculin* in tuberculosis produced by inoculating the anterior chambers of the eyes of dogs with pus containing tubercle bacilli. Three dogs were thus inoculated, and after tuberculosis of the iris had developed they were given injections of tuberculin in ascending doses. As a control experiment a fourth dog was inoculated, but was not given any injections of tuberculin. He concludes (1) that in the three injected animals the tubercular processes were not checked, but continued in increased severity; (2) that there was no marked difference in the necrosis of the tubercular tissue in the four animals; (3) that the absence of haemorrhages in the control animal was striking, there having been such in the three injected ones; (4) that the number of bacilli was far greater in the three injected ones; (5) that there was no real difference in the ensuing ocular inflammations; if anything, in the injected ani-

mals the eye was more quickly destroyed than in the uninjected one. Schwann II,⁶⁹ reports the healing within sixteen days of a tubercular ulcer of the cornea of a child 9 years old, after six injections of tuberculin. Landgraf¹⁰⁰ reports a case of tubercular tumor of the uvea, treated with injections of tuberculin. The growth filled half of the anterior chamber, and had been developing for more than a year. Thirty-five injections were given in increasing doses during a period of less than three months, and at the end of this time there remained only a small trace of the tumor. The tension, which before the injections was considerably lessened, became almost normal. During the treatment two mil- iary tubercles appeared in the iris, but were also absorbed. He believes that the absorption is preceded by an acute cheesy or fatty degeneration, and that the danger from the liberation of bacilli is overestimated. Gepner¹⁰⁰ has reported a case of lupus of the lip, nose, and conjunctiva, in a girl 23 years old, treated with tu- berculin. After each injection there was decided local reaction, with manifestations of profound constitutional disturbance, but with notable improvement in the morbid condition. Schaffra- nek⁶⁹ has recorded a case of scrofulous disease in a laborer 26 years old, who, besides other characteristic manifestations, exhibited photophobia, velvety redness of the palpebral conjunctiva, with purulent secretion, subconjunctival injection, and extensive opaci- ties of the cornea. Other remedies having failed, the injection of tuberculin was, in the course of four weeks, followed by complete and persistent recovery. Wagner³⁴ gives a very complete *résumé* of the subject of tubercular eye diseases. He reports cases of tuberculosis of the conjunctiva, sclerotic, iris, and ligamentum pectinatum, which were treated by injections of Koch's tuberculin, the first two being cured, the third much improved. Hallopeau³ records a case of tuberculous leprosy, in which several injections of Koch's lymph apparently provoked a new attack of leprous keratitis.

A contribution to the study of the value of *pyoktanin* in inflammatory conditions of the eye is made by Dujardin,²²⁰ who asserts that, in his hands, this drug has notably diminished the violent inflammatory reaction which often accompanied keratitis, especially in young subjects; but that its antiseptic qualities, if not uncertain, at least seem to be inferior to those of the more com-

monly used remedies. He has remarked the analgesic properties pointed out by Alt, not only in keratitis, but also in other painful affections, as in iritis, and he raises the question whether the value of the drug, when employed locally, does not depend more especially upon this peculiar property.

Hoffel²¹ claims that he has obtained good results from the use of pyoktanin in eye affections. He uses the yellow and the blue pyoktanin, in freshly-prepared solutions of 1 per cent., the yellow and blue pencils, and the yellow salve. Catarrhal and purulent conjunctivitis was treated by the drops and penciling, without the least irritation, and with most satisfactory results. In chronic cases, the lids were scarified and the solution dropped on, while the retrotarsal folds were penciled. Even when there is loss of the epithelium of the cornea, as in lime-burns, the author believes that pyoktanin does better than any other substance. Gould¹¹² has found the greatest value of blue pyoktanin to be in the treatment of dacryocystitis and lachrymal conjunctivitis. He has also seen it of service in clearing up certain forms of corneal opacities, especially the "peculiar chronic soft leucomata" sometimes resulting from interstitial keratitis, pannus, and like affections. De Schweinitz¹¹² believes that it exercises a very beneficial influence in drying up the abnormal secretions of the lachrymal passages. While not enthusiastically impressed with its merits, Marchetti⁵⁸⁹ finds the drug of value, especially in acute dacryocystitis and in profuse blennorrhœa of the lachrymal sac. Galezowski³ has treated with success 2 cases of epithelioma of the lids by brushing the ulcerated surface with a solution of pyoktanin (1 to 50 or 100) five or six times a day. Tiffany's experience⁷⁸⁶ has been that the good effects of methyl-violet are especially to be realized in inflammations of the deeper structures of the eyeball. Gilman¹⁸⁶ has found it of most value in cases of traumatism; the drug seemingly preventing suppuration where this complication might have been expected, from the nature of the injury.

Hosch²¹⁴ has found, in using Ehrlich's methylene-blue method of staining in the eye of an albinotic dog, that the tissues rich in blood-vessels, as the choroid and ciliary body, were so deeply stained as to be worthless for microscopic examinations; the nerve-elements of the cornea, iris, and retina, however, were beautifully

stained, and could be traced better than with any of the former methods.

Bourgeois⁵⁷⁷ speaks enthusiastically of *aristol* in the treatment of inflammatory disease of the eye, especially when it is required to suppress a focus of suppuration or repair a loss of substance, as in ulcerous or suppurative keratites. He considers it an excellent antiseptic, and perfectly harmless. The class of cases in which Wallace¹¹² finds *aristol* to show "its effects most markedly comprises follicular inflammations of the conjunctiva, phlyctenular disease of the cornea and conjunctiva, marginal blepharitis, ulcers, and after enucleation of the eyeball as a desiccant. In papillary trachoma the drug seems only to aggravate the symptoms.

The opinion expressed by Boé at the Berlin Congress of 1890 (see ANNUAL, 1891), touching the plan of treatment to be adopted in developed panophthalmitis, has been still further strengthened¹⁷¹ by new bacteriological observations. For use in ophthalmic surgery, Crippen⁷⁷⁸ advises a modified compress sponge, composed of folds of gauze which have been boiled and kept in antiseptic solution. Just before using, it is to be rinsed in sterilized water and squeezed dry. Frothingham⁶¹ has devised a wire *mask for protection of the eye after operation*. It is firm enough to resist severe blows, and is so secured as to remain in place when applied to the most restless and unruly patients.

Gruening²⁴⁹ has constructed a set of *ophthalmic instruments*, not including knives and scissors, the working portions of which are made of an alloy of *platinum and iridium*. He claims that the time required for the sterilization of instruments of this description by imparting to them a white heat is but a small fraction of the minute, so that every instrument required for operation can be prepared in a direct, simple, and thorough manner by the surgeon. Groenouw¹⁸⁰ describes a *sterilizing apparatus* constructed so as to permit only the metal parts of instruments with bone handles to be immersed in boiling water. F. Becker²⁵³ describes an *eye-douche*, convenient and simple of application, in which the fluid used may be suitably warmed and siphoned to any desired point. The warm douche has been found to act advantageously in acute conjunctivitis, 68° to 77° F. (20° to 25° C.); in scrofulous conjunctivitis, and the irritative conditions so common after severe inflammations of the uveal tract, 50° to 59° F. (10° to 15° C.); and, finally, in

simple blennorrhœa, ulceration of the cornea, and trachoma, where a caustic effect is produced by a temperature of 104° to 122° F. (40° to 50° C.).

Black,⁵² has devised an *instrument for the removal of foreign bodies from the cornea*. It consists of a round, needle-like shaft,



KNAPP'S FORCEPS FOR TRACHOMA.
(New York Medical Record.)

the very fine terminal end of which is flattened at the expense of the anterior surface, making it slightly spoon-shaped. The extreme tip is minutely hooked; the instrument may be used either as a tractor or as an elevator. Knapp,⁵³ has devised a *forceps*, shown in the accompanying cut, intended for use in the treatment of *trachoma*. Affixed to the ends of the blades are creased rollers, between



PYLE'S SELF-RETAINING LID ELEVATOR.
(New York Medical Record.)



PYLE'S SELF-RETAINING LID ELEVATOR
IN USE.
(New York Medical Record.)

which the conjunctiva is firmly grasped, and, as the instrument is drawn away, the contents of the follicle are pressed out without causing much laceration of the tissue. He finds that by the use of this contrivance follicular trachoma can be permanently cured at one sitting without subsequent contraction or scars.

The accompanying cuts represent a *self-retaining lid elevator* and its adaptation, devised by Pyle,⁵⁴ the purpose of which is "to do away with the stop

speculum in cataract operations and iridectomies, and the necessity of having an assistant to hold the ordinary lid elevator." The same author ⁵⁹ has had constructed a *fixation forceps*, shown in the accompanying figure, the jaws of which form a segment



PYLE'S FIXATION FORCEPS.
(*New York Medical Record.*)

of a circle, corresponding to that which the eye describes behind the corneal limbus. The advantage claimed for the instrument is that "a large amount of the conjunctiva can be seized, and the eye embraced in such a manner as to effectually prevent the ball from rotating on the horizontal or vertical axis."

The accompanying cut represents an instrument devised by A. L. Smith ²⁴⁹ for the purpose of *centring lenses*, and for measuring the degree of a prism or prisms in lenses, combined with the spherical or cylindrical surfaces. He also ²⁵⁰ describes an instrument for determining the *power of lenses*, consisting of a graduated dial, from the upper portion of which project three posts, the middle one being depressible and attached to a central mechanism operating an indicator. The lens to be tested is pressed against the post, and the focal length is registered upon the dial. An instrument has been de-

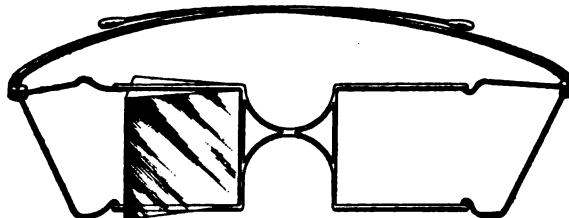


SMITH'S INSTRUMENT FOR CENTRING LENSES
AND MEASURING PRISMS.
(*Archives of Ophthalmology.*)

vised by Prentice ²⁵⁰ to *measure prisms*, specifically according to the metric system previously advocated by the same author, the necessity for its use being clearly shown by a detailed discussion in which the present process of prism-manufacture is comprehensively described as being inadequate for producing prisms

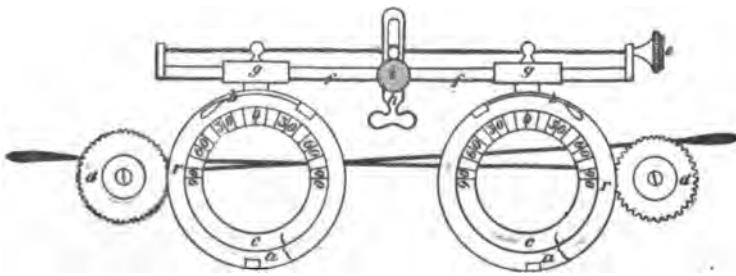
of absolutely uniform measure, in large quantities and at sufficiently low cost to render them available as spectacle glasses. This so-called prismometer is therefore recommended as being of special value in enabling any one, with commendable accuracy and dispatch, to make any required selection of definite value from a stock of variable prisms.

The accompanying sketch shows the features of a *square prism and a trial-frame* adapted for its use, designed by Percival.² It is so arranged that the prisms can be quickly slipped



PERCIVAL'S SQUARE PRISM AND TRIAL-FRAME.
(*British Medical Journal.*)

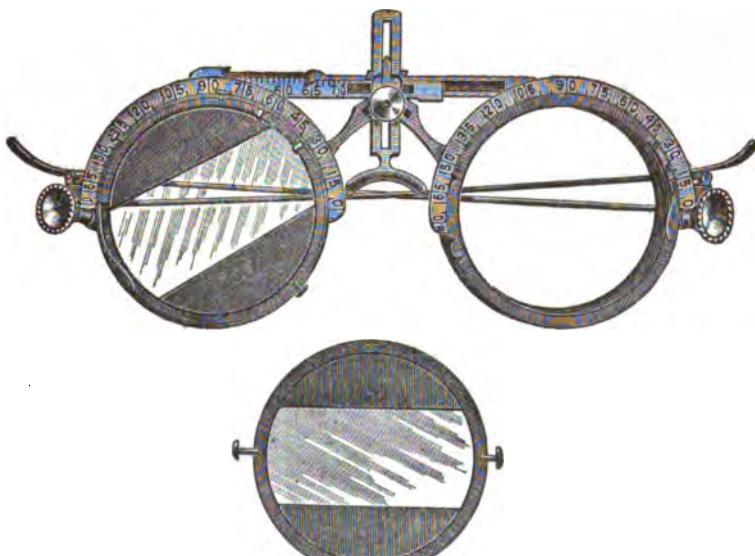
into the frame, either edge or base up or in, as may be required, and be held in position by a projection. The principal advantage is that the square shape renders rotation into a faulty position impossible, so that they can be safely lent to patients for trial at their own homes. Gutmann³⁵³ presents a new model of trial-



GUTMANN'S TRIAL-FRAME.
(*Klinische Monatsblätter für Augenheilkunde.*)

frame, which has some advantages to recommend it. A cut of the instrument shows the details of the construction. Gillet de Grandmont¹⁷¹ has invented an improved form of trial-frame and lens, as shown in the accompanying cut. The most important feature consists in having the rims of the cylindrical lenses provided with small rings at the prolongations of the axis. When in use, a mov-

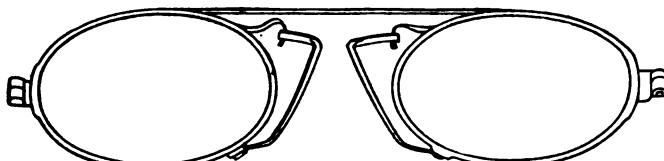
able button on the trial-frame is fixed at the point of the graduated arc which previous examination has indicated as the axis of the patient's astigmatism; so that the trial-cylinders can be rapidly changed before the eye, the button of the frame arresting the little



GILLET DE GRANDMONT'S TRIAL-FRAME AND LENS.
(Annales d'Oculistique.)

ring on the rim when the cylinder axis corresponds with the axis of astigmatism.

In an interesting and graphic article, Charles Hermon Thomas²⁰⁴⁸ demonstrates the mechanical principle involved in the *construction and adaptation of spectacle frames* suitable to all the requirements of practice. Bearing in mind the anatomical arrange-



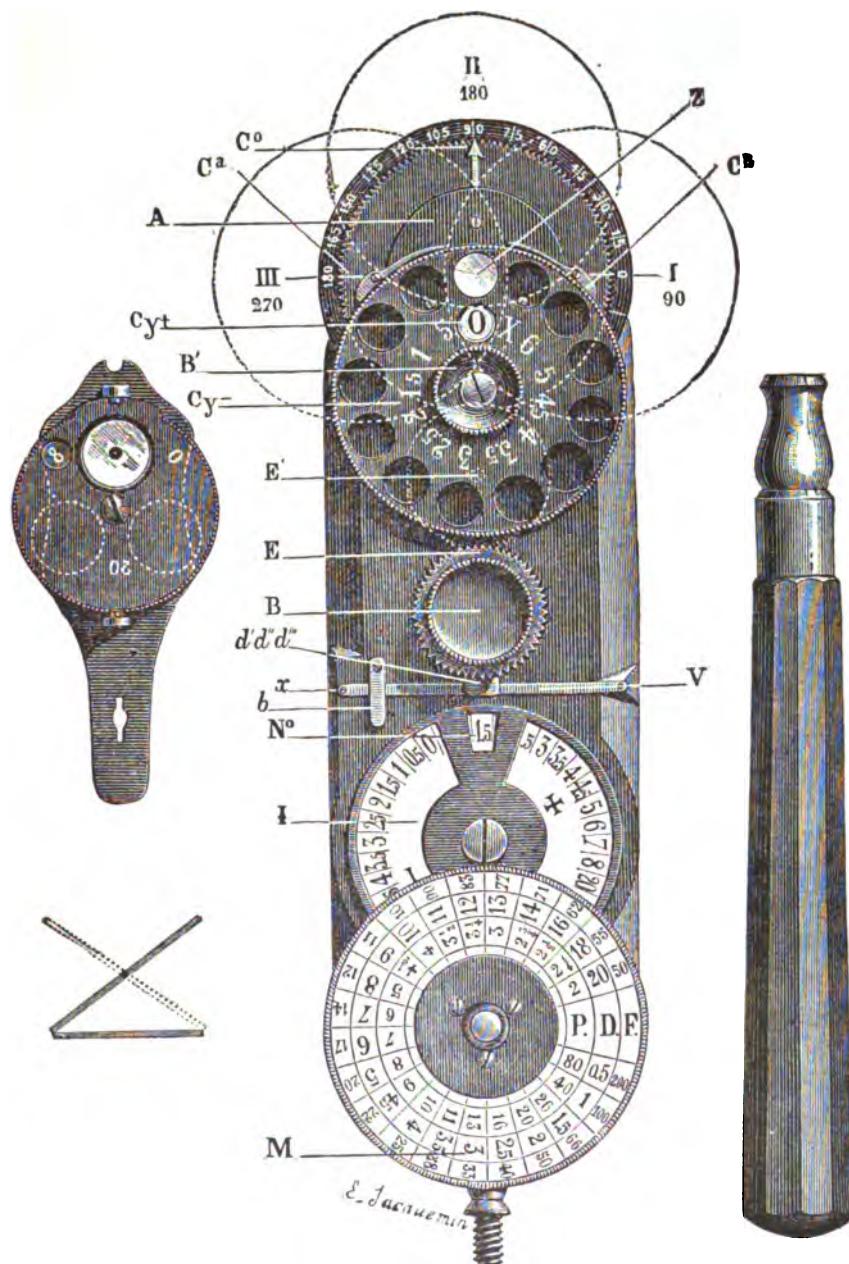
SCHWABE'S EYE-GLASS FRAME.
(Klinische Monatsblätter für Augenheilkunde.)

ment of the cutaneous blood-vessels of the nose, Lueddeckens²⁵⁴ has devised a rather ingenious *nose-piece* for spectacle frames, which he claims causes no discomfort and interferes very little with the circulation of the area bearing the pressure. The parts of the

bridge resting upon the nose run obliquely forward, downward, and a little outward; while the parts bearing the frames run obliquely upward. The pressure is thus parallel to the course of the blood-vessels. Schwabe ⁸⁵³ has devised a frame for eye-glasses, by means of which he hopes to avoid pinching of the nose and contact with the lashes, to prevent slipping downward, and to keep the glasses in position. The details are shown in the cut on page 149.

Jackson ⁷⁰⁰ _{Sept. 20} has had constructed an *ophthalmoscope*, which for general use he considers: 1. One in which the difficulties of using the instrument are as far as possible overcome. 2. One that will be as satisfactory as any of the best instruments for any case likely to be encountered. 3. One which is cheap. Parent ²⁷⁴ _{July, Aug.} has devised an optometric and phakometric ophthalmoscope upon the general model of Morton's instrument. A chain of lenses, 20 concave and 15 convex, is moved by a concealed system of toothed wheels, controlled by the disc M, the lens which is brought before the opening Z being indicated upon the index-wheel I. In addition to spherical lenses, the instrument is provided with a mechanism by which cylindrical lenses may be added with axes at any desired angle. This is accomplished by a disc A (movable about the opening Z), to the circumference of which are pivoted two discs, one superposed upon the other, the external bearing concave cylinders from 0.50 dioptres to 6 dioptres, and a convex spherical lens of 10 dioptres (marked X). The lower disc carries convex cylinders of the same numbering, with a concave spherical lens of 10 dioptres. By using these two spherical lenses in conjunction with the other spherical series, combinations up to + 20 dioptres and — 26 dioptres can be formed. The inclination of cylinder-axes is secured by rotating the disc A, when the lens-bearing discs successively assume the positions indicated by the dotted figures. The axes of the plus and minus cylinders are placed at right angles one to the other. The details of the instrument are well shown in the accompanying cut.

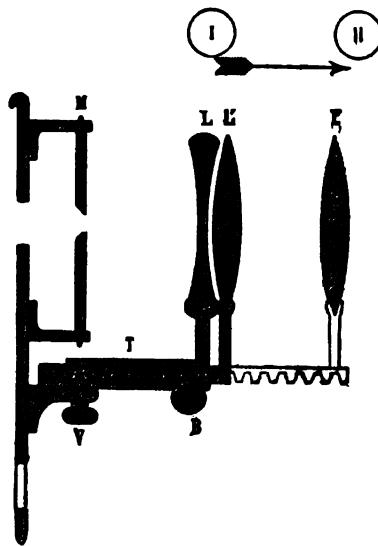
The same author ²⁷⁴ _{July, Aug.} describes a new model of *ophthalmoscopic mirror*, by which he can at will obtain, for direct examination, divergent, parallel, or convergent rays. M is a plain mirror, pivoted; L is a concave lens of 25 dioptres, of colorless glass; and L' is a convex lens of 25 dioptres, of bluish tint. In the first position (I), L and L' are in contact, and the focal distance equals ∞ ;



PARENT'S OPHTHALMOMETRIC AND OPTOMETRIC OPHTHALMOSCOPE.
(*Archives d'Ophthalmologie.*)

in the second position (II), L and L' are distant 15 millimetres, and the focal distance of the mirror is now 66 millimetres, if the

incident rays are parallel. When the lamp is placed at a distance of 20 to 25 centimetres from the mirror, as is usual, the reflected rays will be divergent when the lenses are in contact; sensibly



PARENT'S OPHTHALMOSCOPIC MIRROR.
(*Archives d'Ophthalmologie.*)

parallel if they are slightly separated; and, finally, convergent if farther separated. The detail of the apparatus is illustrated in the accompanying cut.

SECTION VI.

UNCLASSIFIED.

Esperandieu²⁸ gives an interesting *archæological sketch of a Roman oculist's seal*, discovered at Poitiers in 1752 or 1753, a description of which was found among the papers of the celebrated Beaumesnil. Louge²⁹ suggests the use of the *ophthalmoscope in osteology* for examining the structure of bone and bony cavities, finding it especially useful in studying the minute anatomy of the temporal bone and its auditory structures.

Boinet and Silbert³⁰ report that they have extracted from the urine of a patient with well-marked exophthalmic goitre three varieties of ptomaines, whose physiological action they have carefully studied.

OTOLOGY.

BY CHARLES S. TURNBULL, M.D., PH.D.,
AND
ARTHUR AMES BLISS, A.M., M.D.,
PHILADELPHIA.

CHIEF among the newer methods in otology is the excision operation, in its different phases. This procedure is still performed mainly by the few otologists who have revived its use. Their reports are decidedly favorable, and yet bear the impress of unprejudiced judgment. Some of these operators refer modestly to their work as having been, comparatively, of easy performance. The beginner in this line of practice must, however, not anticipate such ease for himself; for, as a matter of fact, it is doubtful if there is a more difficult operation in the whole range of modern surgery.

The operation offers the only hope of betterment in a vast number of cases where the pneumatic speculum, Politzerization, catheterization, bougies, perforation of the drum-head, and section of the tensor-tympani muscle have reached their limit of improvement. It is to be hoped that these excision operations, whether used in cases of plastic otitis or for the removal of necrosed ossicles, will be given a fair trial, and that otologists will prepare themselves for the proper performance of this work. Adverse criticism should be indulged in only by men who have fairly tried these methods. No one should attempt this procedure without having first obtained the requisite skill by practice upon the cadaver, and afterward—well, we might say, afterward upon dispensary patients. The man who succeeds will do so by becoming a student, and not by reason of his being an otologist skilled in the older methods of treatment.

EXTERNAL EAR AND DRUM-HEAD.

Foreign Body in the Tympanic Cavity.—Gruber³⁸⁵ gives the details of a case in which he removed a round wooden knob, four millimetres in diameter, from the tympanic cavity. To reach the
(C-1)

parts it was necessary to detach the auricle and chisel away the outer portion of the upper and posterior wall of the meatus. To expose the tympanum sufficiently it was also necessary to scrape away the deeper portion of the posterior wall. This was effected by means of sharp spoons.

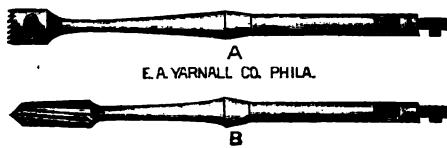
Foreign Body in Auditory Canal.—Th. Schmidt³¹ reports the removal of a cherry-stone, which, by the family history, was shown to have been placed in the ear in early childhood of the patient, where it had remained during forty-seven or forty-eight years. Until one week before its removal, the stone had not caused any noticeable symptoms.

Mucor Corimbifer in the External Meatus.—Graham, of Syria,⁶ reports a case in which this growth was found in a mass of cerumen removed from the ear of a patient who had complained of tinnitus and a sensation of itching within the auditory canal. It is claimed that this is quite unique, there being only one other case on record.

Aural Hallucinations Cured by the Removal of a Foreign Body from the Ear.—The history of a patient is given⁵⁴⁷ in whom tinnitus was so intense and took such definite shape (threatening, or devilish voices, etc.) as to induce great mental depression—not, however, giving rise to systematized delusions. Twelve hours after the removal of masses of inspissated cerumen and pieces of tobacco from the ear, the "voices" disappeared entirely and were not noticed again. The patient was kept under observation for two weeks. This case illustrates how certain abnormal mental states may be induced by the mere presence of foreign bodies in the auditory canal.

Bony Growths in the Meatus, and their Removal.—Urban Pritchard⁶⁶ classifies these growths into three varieties: (1) multiple, smooth, rounded, and of ivory-like density; (2) multiple, irregular, and with broad bases; (3) single, polypoid exostosis, with dense nucleus, surrounded by cancellous structure, the pedicle bony and attached to outer edge of bony meatus. *Treatment:* Variety 3 should be promptly removed, a dental elevator or a pair of dental stump-forceps being used to divide the narrow pedicle. Varieties 1 and 2 are best removed by burrs and drills. (See Figs. A and B). Their bases can be pierced by numerous punctures with the fine drill—Fig. B—or, if involving the entire calibre of

the canal, the same drill can be used to bore out a large opening. For separate growths the author has devised a small trephine—Fig. A. It offers several advantages over the drill: (1) as a rule, only “one sitting” is necessary; (2) there is less trouble from slipping or running of the instrument on the surface of the growth; (3) no delay from change of instruments; (4 and 5) less *débris* to be removed and less haemorrhage, therefore a more open field of operation. The first and second varieties do not require operative treatment unless they cause a serious degree of occlusion of the auditory canal. During operation a general anæsthetic is required. As a rule, results after operation are highly satisfactory.



E. A. YARNALL CO. PHILA.

B

BONY GROWTHS IN THE MEATUS, ETC.

A, trephine; B, drill (medium) used for the removal of exostosis. (Exact size.)
(Archives of Otology.)

Osteoma of the External Auditory Canal.—Lichtenberg, of Buda-Pesth,³⁷ removed, by means of the écraseur, a bony tumor from the external auditory canal of a patient. This growth was covered with a smooth, reddish-white envelope, and was situated two millimetres from the meatus, upon the anterior cartilaginous wall of the canal. The parts of the canal surrounding the growth had become atrophied from pressure. Ballance, of London,² reports to the London Pathological Society, May 19, the removal of a somewhat similar growth, but of much larger size. The patient, a woman 24 years of age, had suffered for twelve years from otorrhœa. Upon examination, a mucous polyp was found projecting into the concha, and beyond this the passage was almost completely obstructed by a bony mass, which was attached to the posterior inferior part of the canal. “The outer surface of the osteoma was convex, and was on the same level as the rest of the surface of the temporal bone. The inner parts of the bony meatus and tympanum were enlarged, carious, and filled with inspissated pus; posteriorly, the dura mater was exposed, and, in front, the tympanum was in communication with a quite large, deep-seated abscess, situated in the zygomatic and infra-auricular

regions. . . . The growth was three-fourths inch in diameter, fairly circular, and, on removal, a hole fully one-half inch deep was left in the side of the skull."

Stricture of External Auditory Canal.—L. J. Hammond, of Philadelphia,¹¹² reports 2 cases of this condition, both resulting from neglected otorrhoea. In case 1 the stricture had its seat about three-fourths inch within the external meatus. This patient presented, also, symptoms of mastoid disease. In case 2 the stricture was about three-eighths inch from the external meatus. Treatment consisted in the making of four deep incisions, one in each wall of the canal. There was extensive necrosis of the posterior and superior walls of the bony canal in both cases, this necrosis extending beyond the strictures. This deep tissue was curetted away, it being necessary, in case 1, to extend this process to the mastoid region. The canals were kept free from pus by injections of hydrogen peroxide, and were packed with salicylated cotton. This dressing was renewed daily. The stricture disappeared, in case 1, within fourteen days; in case 2, within twelve days. Case 1 did not entirely recover for eight weeks, and there was loss of almost the entire bony wall and mastoid region. These patients illustrate the importance of prompt treatment in the early stages of purulent otitis.

Traumatic Occlusion of the External Auditory Meatus.—M. L. Foster, of New York,¹¹³ had a patient, a boy 11 years of age, in whom, as a result of traumatism, the external auditory meatus was completely closed by a thick membrane, covered with integument, and situated about one-fourth inch from the tragus. A small opening was found in the posterior superior quadrant of this membrane. The opening was dilated slightly by means of a Weber lachrymal probe, and a piece of India-rubber drainage-tube was passed through by the aid of an improvised wire probe. The pressure of this tube soon caused the opening to enlarge sufficiently for the introduction of a tube of larger size, and this was replaced by one of still greater calibre. The best results, thus far, have been obtained by the use of tubes of different materials, but the following operation is suggested for this condition, although the author has not proved its efficacy by actual experiment: Remove the external layer of the occluding membrane; divide the remaining portion into four or more parts, by incisions radiating from the centre, so

Adenoma of Sebaceous glands in External Ear (Kringel).

Burk & McFadden Lith Phila

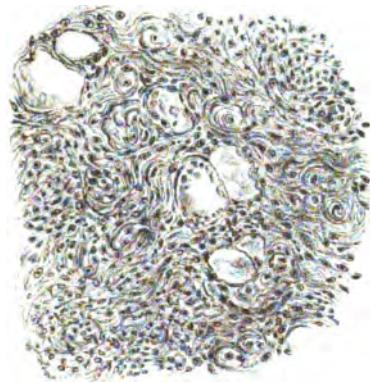


Fig. 3.

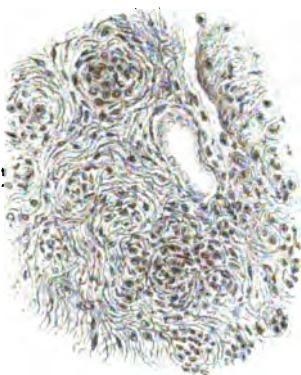


Fig. 4.

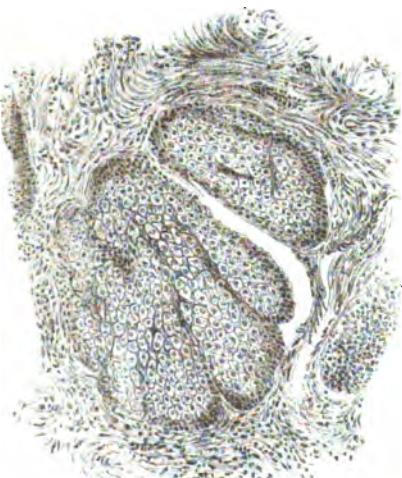


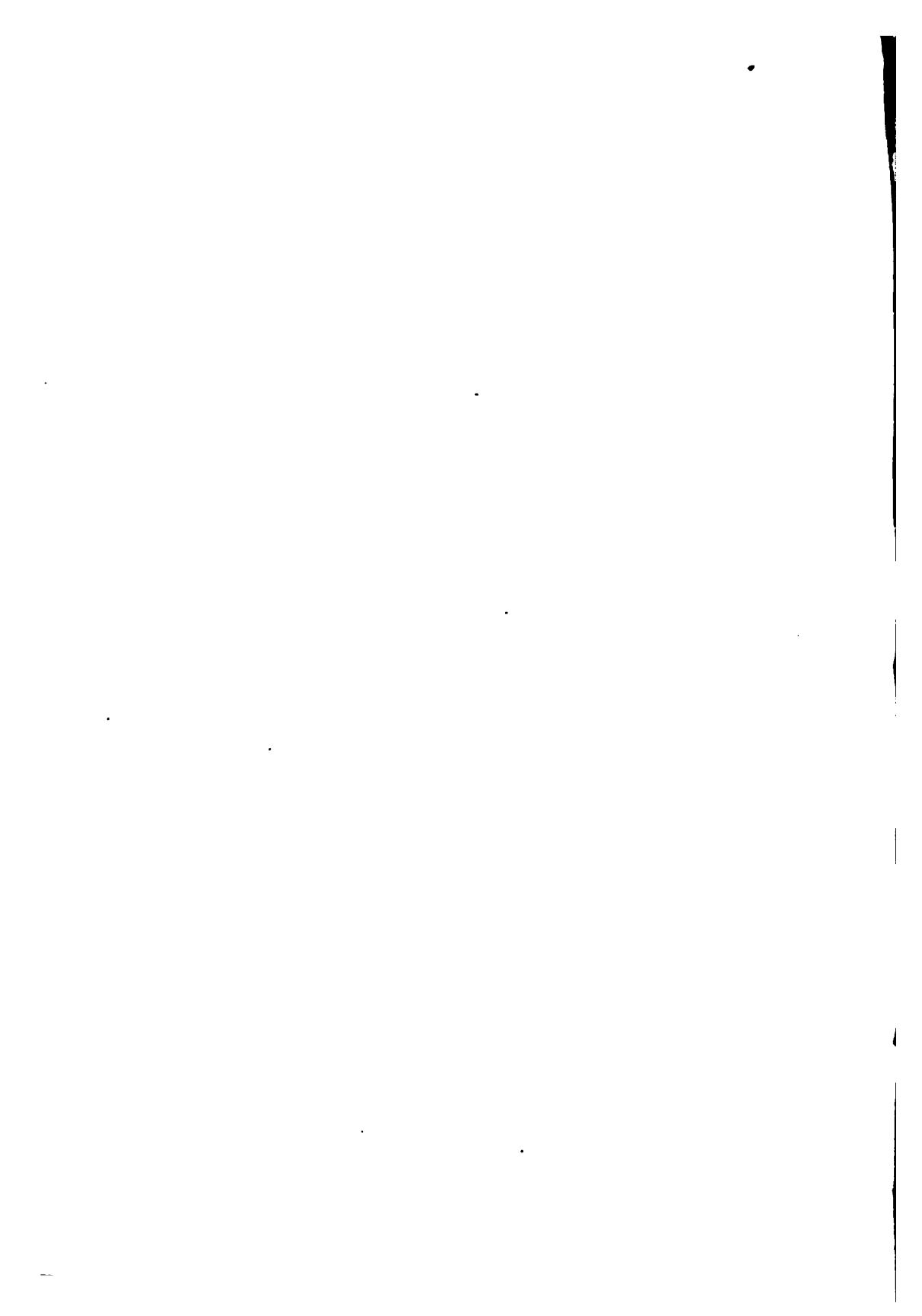
Fig. 6.



Fig. 2.



Fig. 4.



that each portion or flap can be made to lie smoothly upon the wall of the canal; denude the surface of wall covered by these flaps, so formed and laid down, and attach them to the denuded surface by sutures or collodion.

Adenoma of Sebaceous Glands in the External Ear.—C. Klingen-
gel, of Berlin,³⁴⁴ has met with 2 cases of this condition. The tumors were about as large as peas, and their seat was in the anterior part of the auditory canal. Fig. 1 illustrates that of the first case, which is the only one described, as the other resembled it closely. The growth was soft and yielding, covered with epidermis, and supplied with fine hairs. It had not caused pain, nor did it interfere with the patient's hearing. Its removal was effected by means of the electro-cautery snare. Upon section, the growth showed, in the centre, numerous fine fibres of connective tissue arranged in every direction and formed into loose meshes, a few single connective-tissue, spindle-formed cells, or these cells in scattered groups. Few vessels were found, and these had imperfect walls, of varying degrees of thickness, formed from endothelium. In some places the proliferated endothelium showed hyaline degeneration. (See Figs. 3 and 4.) Toward the periphery the connective-tissue cells became more numerous, were larger, and of more rounded form. (See Fig. 5.) About the hair-follicles were numerous enlarged ceruminous glands, sometimes lying deep in the connective-tissue and distinct from the hair-follicles. (See Fig. 6.) They appeared like normal ceruminous glands, but were developed in excess of the normal supply. Each group of glands was surrounded by a delicate connective-tissue covering. In short, the growth was a connective-tissue tumor, covered with epidermis and containing new-formed glandular elements in great excess, which, as to structure, presented the characteristics of normal glandular tissue.

Explanation of Plate.—Fig. 1. The tumor, as seen in the meatus of Case 1. Fig. 2. Section through the centre of the growth. Figs. 3 and 4. Hyaline degeneration of proliferated endothelium in the walls of the vessels. Fig. 5. Cell-groups in the periphery of the tumor. Fig. 6. Hypertrophied ceruminous glands.

Furuncles.—Lawrence Turnbull, of Philadelphia,⁷⁰⁰ claims that gout is a frequent cause of furunculosis. When arising from this disease, the inflammation in the canal is relieved by the following treatment: The ear is to be washed with an alcoholic

solution of boracic acid; it is then painted with a solution of bi-chloride of mercury,—1 to 2000; the parts are then to be covered with a preparation of the yellow oxide of mercury in vaselin. Internally, the patient is given liquor potassii, U. S. P., 10-drop doses in water; also, quiniæ muriatis, 2 grains (0.13 grammes), until 8 grains (0.52 grammes) have been taken, if there is very severe pain of neuralgic character. The diet is to be regulated strictly, so as to exclude all saccharine articles. Grünwald, of Munich,³⁴ recommends the following treatment for furunculosis: When the parts cannot be incised, the auditory canal is to be cleansed with an anti-septic wash. A small layer of cotton is then soaked in a 20-percent. solution of the subacetate of alum, and is placed as deeply in the canal as possible. This is covered with a layer of dry cotton, and one of rubber outside, so as to maintain the heat and moisture of the inner pledge.

Vesicles in the External Auditory Meatus.—H. L. Swain, of New Haven,⁶⁶ has made report of 5 cases showing these lesions. The condition is exceedingly rare, having been found by the author in only 5 cases among 2000 aural patients. The vesicles appear upon the drum-head or in the auditory canal, and are associated with intense pain, deafness, the appearance of the lesion (small herpes-like blebs), and a serous discharge, becoming, sometimes, purulent. The symptoms are relieved by opening the vesicles and by the use of antiseptic washes. The condition was observed to be a complication of *la grippe*.

Syphilis of the External Ear.—Adolph Rupp, of New York,²⁴⁵ states that these lesions are found usually, but not always, in connection with syphilitic lesions elsewhere in the body. It is comparatively a rare condition, as shown by analyses of clinical work. For example, in the New York Eye and Ear Infirmary, among 28,180 aural patients, 21 are reported as having syphilitic affections of the ear, viz.: external ear, 10 cases; middle ear, 10 cases; inner ear, 1 case; Rupp, among 4000 aural patients, 5 had syphilitic lesion of ear; Buck, among 3976 aural patients, 30 had syphilitic lesions of ear; Déprés, among 1200 syphilitic patients, 6 had syphilitic lesions of ear; Ravagli, among 144 syphilitic patients, 1 had syphilitic lesions of the external ear, and, in 15 cases, the middle ear was affected. The following lesions have been found and reported by the highest authorities on aural disease:

chancre, roseola, maculæ, papules, condylomata, gummata, ulcers. Gruber claims that he has found exostoses of undoubted syphilitic origin, but he stands alone in this opinion, and differs from the views expressed by von Troelsch, Miot, Baratoux, Kipp, Pomeroy, and others. Taylor has found a tubercular syphilide, localized in spots, or, more usually, diffused over the surface of the external ear; such patches are reddish or brownish in color, and the full thickness of the skin is involved. Sometimes they resemble lupus exfoliativus, or they may become inflamed, ulcerate, discharge a sero-purulent exudate, which dries in scales; thus they may resemble eczema impetiginosum. Dry papular syphilides are to be found, and may be mistaken for seborrhœic eczema or psoriasis. Cases of specific ostitis and periostitis of the external canal are described by Kipp and Rupp. Schwartz refers to granulations found in the auditory canals of syphilitic patients. In short, syphilitic disease of the external ear is rare, although nearly every syphilitic lesion has been found in that region.

“Neuropathic Hæmorrhages” from the Ear, Without Perforation of the Drum-head.—Under this term, Luc²⁸⁶ describes a peculiar train of symptoms illustrated by the reports of cases:—

Case I. A man, aged 28 years, had frequent attacks of true epilepsy, commencing at the age of 15 years. During these attacks, there occurred a discharge of blood from the left ear. No lesion of the external ear or drum-head could be discovered. During the intervals between the epileptic fits, there was no appearance of bleeding from the ears. The bloody exudations are believed, by the author, to have proceeded from the walls of the external canal, leaving no perceptible traces behind them. This may account for the negative results of many examinations made upon this class of subjects.

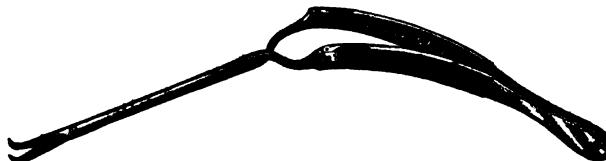
Case II. A hæmorrhage occurred from the ears of a highly neurotic woman, after a very violent fit of anger. Immediately preceding the hæmorrhage, the patient had suffered from headache and tinnitus aurium. An examination of the fundus, after removal of the clots, showed a discolored patch on the posterior wall of the bony canal, close to the drum-head,—of a violaceous color, resembling an ecchymosis. The left ear showed ecchymoses on the drum-head. This bleeding had no connection with the patient's menstrual period, the menses being quite normal, nor

were there any indication of hæmorrhages in other organs. A review of these two cases, with seven others, reported by Huss, Ferrari, Stepnow, Petiteau, Eitelberg, Gradenigo, and Baratoux, show certain symptoms in common, viz., the subjects are neurotic individuals; the attacks are preceded by symptoms which indicate vasomotor disturbances, and are, also, preceded by certain prodromes, headache, tinnitus, etc.; hæmorrhages, not profuse; slight and temporary deafness. Agreeing with opinions expressed by other writers on this subject, Luc regards these hæmorrhages as due to vasomotor paresis and venous congestion of the capillary net-work about the openings of the ceruminous glands. They correspond to similar bleeding seen, in rare cases, in other parts of the body about similar glands, *i.e.*, palms of the hands, ends of fingers, and nipples.

Treating of the same subject—"Periodical Hæmorrhages from the Ears of Hysterical Patients"—J. Baratoux ²¹ _{Nov. 30, 1870} records several cases which illustrate the fact that, in individuals of a "neurotic temperament," there may occur hæmorrhages from the ears without any perceptible lesions. These fluxes are accompanied, often, by similar phenomena in other parts of the body. They have no relationship with the menstrual period. Following the example of Parrot, these cases may be placed in a special class, receiving the name "Neuropathic Hæmorrhages."

MEMBRANA TYMPANI.

New Scissors for the Drum-head and External Auditory Canal.—Alvin A. Hubbell, of Buffalo, ¹⁷⁰ _{Oct.} has devised a pair of scissors to be used upon these parts. The blades are bent near to



EAR SCISSORS.
(*Buffalo Medical and Surgical Journal*.)

the point, so as to extend $\frac{1}{10}$ inch on a curve nearly at right angles to the shaft. The instrument is light, but strong; can open and close in the auditory canal with perfect ease, yet not obstructing a view of the parts to be reached.

Egg-Skin as an Artificial Membrana Tympani.—Cleary¹⁵⁵ has obtained excellent results from this well-known, but seldom-used, remedy for ruptured drum-heads. He applies small circular or oval pieces, "by means of a dropper or a probe," covered with cotton. One case is detailed in which hearing was increased from 0 to 15 feet for whispered words. The pieces are removed every 4 or 5 weeks. No irritation is caused by this application, and the ruptured drum-heads heal very readily.

A New Sign of Perforation of the Drum-head.—Milson¹⁵⁶ calls attention to the fact, that where a perforation of the drum-head exists, the action of Siegel's, or other pneumatic specula, will aspirate the moistened air from the tympanic cavity against the cold glass, where the air will be condensed and cause a cloudiness. He considers this a positive means of diagnosis; it is, also, a simple process, and easily performed.

Benzoinol for Moistening Artificial Membrana Tympani.—Spaulding, of Portland,¹⁵⁷ recommends the use of this substance—a purified benzoated oil of vaselin, or liquid vaselin—in preference to glycerin, as a means of moistening cotton pellets, used as artificial ear-drums. He finds that patients "hear better, and for a longer period, without a change of the cotton," when this fluid is substituted for glycerin.

MIDDLE EAR.

The Operation of Excision.—There has been so much unfavorable comment upon the "excision" operation that it seems only just to Samuel Sexton,¹⁵⁸ of New York, to publish a few of the reported cases, which, certainly, record results far beyond any to be hoped for from the less radical methods of treatment:—

Case I. Mrs. A., aged 46 years; deafness has been increasing during ten years, the right ear giving most trouble; excessive tinnitus in both. Hearing: tuning-fork against the teeth heard as a bell within the head; ordinary voice heard at 3 feet, but no appreciation of conversation; can hear best "in a noise." The drum-heads are lustreless, the left being retracted, irregular, and showing scars from a former otitis media. *Operation:* Removal of malleus and drum-head of left ear. Two months and two weeks later, the same operation was performed upon the right ear. *Final report*, made one year later: Patient can now maintain a conversation, even in a crowded room; can derive pleasure from attendance at

opera and theatre, sitting within the six front rows of orchestra; tinnitus has entirely disappeared; patient has resumed her former position in family and social life.

Case II. Mr. De C., aged 32 years; ear symptoms have existed for eight years, becoming much worse during the last four years. Unfavorable prognoses have been rendered by several aurists. The patient has become mentally depressed, and his general health is much below par. *Examination*: Right drum-head is porcelain-like, but translucent; left is dull and humid. Hearing: Voice, left ear, 5 feet (loud); right ear, 5 feet (ordinary, if plain). Watch, left ear, $\frac{6}{8}$; right ear, $\frac{6}{8}$. *Operation*: Removal of drum-head and malleus of left ear, and separation of incus from stapes. The corda tympani was divided. *Result*: Immediate improvement in hearing. On the tenth day after operation, examination of the left ear gave, for voice, 5 feet (low), 10 feet (ordinary), 20 feet (plain, ordinary); watch, $\frac{6}{8}$. One year later, this patient still maintained his improvement. The drum-head was reproduced, but was destroyed by the use of solutions of traumaticine and salicylic acid, resort being had, at last, to the knife.

Case III. Mr. C. C. M. has been totally deaf in the right ear since childhood, the cause being scarlatina; had had defective hearing in the left ear for the past seven years, due to chronic catarrh. *Examination*: Right ear, drum-head retracted and cicatrized, dry as parchment; malleus displaced, its neck appearing below the margin of the auditory plate; attachment of tensor tympani muscle is visible. The left drum-head is lustreless. Hearing: Voice, right ear, $\frac{1}{2}$ inch (ordinary); left ear, 1 inch (ordinary conversation); at 3 feet hears shouting, with difficulty. Watch, *nil* for both ears. There is no tinnitus; complains of vertigo upon exertion; hears best in a noise. *Operation*: Removal of drum-head and malleus of the right ear. *Result*: Immediate improvement. Two days later, was free from all abnormal sensations in the right ear; could hear ordinary voice at from 3 to 5 feet, and loud voice at 20 feet. Seven months later, it was found that this improvement had been maintained.

Case IV. Mrs. D., aged 52 years; a very neurotic subject; has suffered from much tinnitus and deafness, following the ingestion of large doses of quinine, 60 to 80 grains (3.89 to 5.19

grammes) per day. This was taken, several years ago, for malarial fever. The drum-heads are dull and humid in appearance. Hearing: Voice; left ear, 2 feet (ordinary); right ear, 3 or 4 feet (plain). At 10 feet, she can scarcely hear a loud voice when using both ears; has wave-like tinnitus and a friction-sound in ear. *Operation:* Removal of drum-head, malleus, and incus from left ear. *Result:* All abnormal sensations disappeared from this ear, and voice, in ordinary tone, could be heard at 4 feet, loud tone at 10 feet, and fairly well at 20 feet. (For details of Sexton's methods, etc., see Sexton's book ²¹⁸⁵_{pp. 358-359}; also, ANNUAL, 1891, vol. iv, "Otology," C-31.)

Charles H. Burnett, of Philadelphia, ⁶¹_{Sep. 20} states that the indications for the operation are: (1) the deafness, tinnitus, and vertigo of chronic middle-ear catarrh, especially when adhesions of the membrana or ankylosis of the ossicles exist; (2) the suppuration, deafness, tinnitus, vertigo, headache, and recurring earache of chronic, purulent, middle-ear catarrh. The *rationale* of the procedure, in dry catarrh, is to free the foot-plate of the stapes and give means of entrance for vibrations coming from without, through the auditory canal, into the inner ear; in purulent catarrh, the removal of necrotic tissue and, as a result, the liberation of the stapes from undue pressure and obstruction.

Method of Operation in Cases of Non-Suppurative Catarrh.

1. Make an incision, behind the short process of the malleus, upward to membrana flaccida, and then backward through the periphery of the posterior superior quadrant. This should expose the incus stapes-joint. Then, between the malleus and incus, pass a small, two-edged, triangular-shaped knife, two millimetres long, the blade being at right angles to shank. This instrument is rotated between the thumb and forefinger of the operator's hand, and the incudo-stapedial joint is thus severed. Next, lengthen the incision in the drum-head downward, if the incus cannot be removed through the flap already made.
2. Grasp the incus by its long process, and withdraw the ossicle.
3. With a curved, two-edged tenotome, sever the tendon of the tensor tympani muscle, by cutting upward, behind the short process of the malleus.
4. With a probe-pointed knife, sweep around the periphery of the drum-head, seize the malleus, at or above the short process, and withdraw this ossicle and the drum-head together.
5. All haemorrhage can be controlled by gently mopping the parts with baked

cotton. The meatus is now stopped with baked cotton or iodoform cotton, and is left untouched for twenty-four hours. The author finds that excision gives the only hope of permanent results, in a large class of cases, while the less radical operations are practically useless. The excisive operation gives relief from the sensations of pressure within the head, tinnitus, and vertigo. The least frequent result is permanent improvement of hearing.

The operation has special application to attic suppuration, where it effects the removal of necrosed ossicles, drainage of the part, and free opening for medication. It also opens the way of access to the necrotic walls of the cavity. The same statements apply to suppuration within the atrium. There is frequently a remarkable increase in hearing, while tinnitus is lessened and vertigo and headache made to disappear. The patient's general health is also greatly improved by the stoppage of otorrhœa and the resulting low grade of chronic septicæmia. The steps of the operation consist in causing exposure of the incudo-stapedial joint and removal of the incus, if this ossicle is found to be diseased. In attic cases, the malleus may be removed first. The inner tympanic wall should not be scraped, even though caries be found there, as medication of this area will free it of detritus and enable it to become covered with muco-periosteal membrane. However, if a sequestrum has formed, it must be removed.

In chronic suppurative otitis, with perforation of the *membrana tensa*, the flaccid membrane being intact, excision should be performed in the same way as for a case of non-suppurative catarrh, unless the perforation is sufficiently large to permit of thorough examination of the atrium with a probe. The pathological condition of the mucous membrane, invariably found in such cases, illustrates the hopelessness of attempts at treatment by the older methods, the entire area being veiled by the drum-head, and to be reached only through a small perforation. These are the cases in which otorrhœa runs its course for years, causing extensive necrosis, functional derangement, and often resulting in mastoid disease, thrombosis of the lateral sinus, or, as a least consequence, increasing deafness and the presence of an offensive discharge.

If any hearing exists before the operation of excision, it invariably improves after its performance. The author has not

failed to stop suppuration in all cases of chronic purulent otitis media in which this operation has been performed.

In another article on the same subject, Burnett⁹, reports the following details of a case in which the operation was performed. In his preliminary remarks he states that if the stapes is ankylosed to the oval window excision of the other two ossicles will produce slight, if any, relief to deafness, although, even in such cases, tinnitus and vertigo may be relieved. July 15, 1889, Mrs. X., aged 20 years; as a result of exposure to cold, 18 months ago, she suffered from tinnitus and increasing deafness in the left ear, fullness in the head, and, at times, vertigo. Examination showed the left drum-head to be retracted and depressed, especially over the incudo-stapedial joint. Hearing, 4 feet for isolated words in conversational tone. The Eustachian tubes were pervious. The nares showed general, active, hypertrophic catarrh. The pharynx was in good condition. For a period of twenty months this patient was treated by sprays of Dobell's solution for the nose, cauterization and reduction of the hypertrophied tissue, and injections into the Eustachian tubes by means of the syringe catheter. The aural symptoms grew steadily worse, and hearing was reduced to 6 inches for isolated words. The operation for removal of the drum-head and the two larger ossicles was then performed, according to the method already described. On the day following, there was no reaction from this procedure; hearing had increased to 4 feet for isolated words; tinnitus was not diminished; the sense of fullness and pressure within the ear had gone. During the six weeks following, there was a slight serous discharge from the ear. By the end of this time, regeneration of the drum-head was complete; hearing was 4 feet; tinnitus remained. Four months after the operation, hearing had increased to 12 feet; tinnitus—the pulsating variety—and vertigo had disappeared; a slight, constant tinnitus remained. The patient states that she can hear the conversation of persons seated on her left side, without the necessity of turning toward them. This would have been impossible before the operation.

Miot¹³⁶ gives the following indications and counter-indications for excision: 1. It is indicated in cases where hearing is decidedly improved by an artificial perforation of the drum-head. 2. Where decided indications of ankylosis and fibrous adhesions exist. 3.

The best results are to be obtained in cases where the vibrating tuning-fork, placed on the vertex, is heard best in the deaf ear. 4. In cases of one-sided deafness, with distressing tinnitus, so pronounced as to endanger the patient's mental condition. 5. There is less urgency for the operation where one-sided deafness exists without other subjective symptoms. 6. It is contra-indicated in all cases where tinnitus and deafness depend upon nerve-reflexes, or a central cause. The author's method of operation is as follows: Having thoroughly disinfected the auditory canal, the right-angled bistoury (5, Fig. 1) is passed through the drum-head at 1 (Fig. 2), and an incision is made round the border of the tympanic ring, from that point, following the line 2 to 3 (Fig. 2), quite to the posterior border of the handle of malleus (M, Fig. 2.) The incision is then carried from 1 to 5 (Fig. 2), and the bistoury is

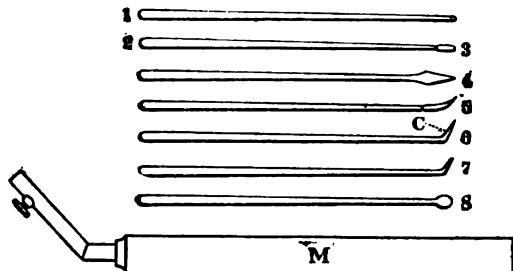


FIG. 1.

EXCISION OF OSSICLES, ETC.

M, handle of malleus; S, Schrapnell's membrane; L, membrana tympani; 1, 5, 4, 6, 7, 8, 2, 3, lines indicating the incisions.
(*Revue de Laryngologie, d'Otoologie, etc.*)

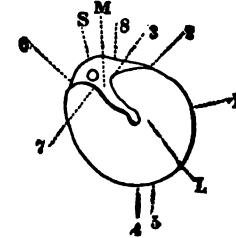


FIG. 2.

removed, to be introduced at 4 (Fig. 2), the incision being carried from this point to 7 (Fig. 2). Thus, a point of adhesion is left between 5 and 4, which holds the loosened drum-head in position. The tendon of the tensor tympani muscle is then incised in the usual manner, a right-angled blade being passed back of and beneath the manubrium, and pressed up against the tendon. The drum-head is then removed with a small pair of forceps. Schrapnell's membrane (S, Fig. 2) and the antero-posterior folds are all that remain of the drum-head. The movability of the stapedial joint should then be tested by a blunt probe. In removing the entire drum-head, the circular incision is to follow the lines 1, 2, 3, 8, 6 (Fig. 2). The pouches of Schrapnell's space must also be incised and the malleus disarticulated from the incus by careful manipulation—fore and aft and lateral movements. If the

malleus cannot be removed alone, the incudo-stapedial joint must be divided, so as to avoid injury to the oval window. Removal of the drum-head, alone, will usually cause a temporary opening, which will last about five months, but, after closure by a new membrane, the operation must be repeated, and, as adhesions are liable to occur between the ossicles, it is wiser to perform a more radical operation, and thus avoid the necessity for a second one. To prevent this recurrence of the membrane, it is well to scrape the bony tympanic ring with Kessel's instrument or the curette of the author. Conditions to be considered in selecting the form of operative procedure are as follow: 1. Cases in which the drum-head is thickened without adhesion. Here, as a rule, mere removal of the drum-head with the manubrium will give permanent results, without resort to a more radical operation. There is less tendency to restoration of the drum-head than in more advanced cases. 2. Cases in which the drum-head is not thickened, and there are no adhesions. Here the tendency to reproduction of the drum-head is very marked. It is best, therefore, to remove the entire membrana with the malleus, and, even in the incus, if adhesion between these ossicles causes immovability of the stapes. 3. Adhesion of the drum-head, with immobility of the ossicles. For such condition, the radical operation is to be selected, but its performance is tedious and difficult, as the drum-head is glued to the walls or contents of the tympanic cavity, and the ossicles frequently buried in a mass of calcareous matter. In cutting and clearing away such adhesions, great care is required to avoid injury to the stapes. The author, after disarticulating the incudo-stapedial joint, examines, by means of the probe, if the stapedo-vestibular articulation is movable. It is possible, sometimes, to mobilize this joint by the use of the flat palate-probe, or by applications of antiseptic solutions and acids.

It is only after having rendered the ossicles movable and obtained some increase of hearing that we must decide which procedure to adopt, viz., removal of drum-head and manubrium, or of the entire drum-head, malleus, and incus. Pain during the operation is not unbearable, if a 10-per-cent. solution of cocaine be used. Threatened syncope should warn the surgeon to stop at once, and resume the operation on another day. Before removing the handle of the malleus or the ossicle itself, a 20-per-cent.

solution of cocaine should be instilled into the tympanic cavity. Accidents during the operation may be as follows: 1. Injury to or complete section of the chorda tympani—indicated by sensation of heat, salty or metallic taste in the mouth, or complete loss of taste; 2. Fracture of the long process of the incus and of the stapes; these accidents may occur during the extraction of the malleus, or during efforts to disarticulate the incudo-stapedial joint; injury to stapes will occasion some loss of endolymph and cause complete deafness, but the rupture is closed very soon by cicatricial tissue. When the operation is completed, a 20-per-cent. solution of cocaine and a 1-to-1000 solution bichloride are applied, and the canal is then closed up with borated cotton, lightly dusted with boracic acid and iodoform. This dressing is to be renewed as the case may require. Some pain and a sensation of heat is noticed in the ear, for from a few hours to two days after the operation. The author has had no cases of otorrhœa after the operation, except where the patient has neglected the ordinary precautions in regard to exposure to cold, etc.

Results: Removal of the drum-head and manubrium, or of malleus and incus, as well, relieves, or greatly diminishes, the subjective symptoms in the ear; renewal of the drum-head will cause a return of these symptoms, but, as a rule, with less intensity than before the operation. Deafness is always lessened. A regrowth of the drum-head will, however, result in an improvement or diminution of hearing, in accordance to the location of the newly formed cicatrix. If the new membrane adheres to the incudo-stapedial joint without affecting the mobility of the stapes, hearing will be greatly improved by its presence, but, should the membrane immobilize this ossicle or act as an obstruction to the passage of vibrations into the inner ear, it will cause much lessening of hearing. The increase in hearing noted immediately after an operation will diminish, to a certain extent, as cicatrices form and the tissues become less moist and flexible. The same phenomenon is noticed in some cases of otorrhœa, where hearing is diminished after cessation of the discharge. To produce, artificially, a moist condition of the mucous membrane, the author has employed many different solutions, but has found the following formula most useful. It is also antiseptic and seems to have some influence in preventing the rapid growth of pathological tissue:—

Iode bisublimé, 0.01 gramme ($\frac{1}{2}$ grain).
Vaseline liq. médicinale, 80.00 grammes (2 $\frac{1}{2}$ ounces).

This is not to be used until all signs of hyperæmia have left the mucous membrane, viz., several weeks after the operation. Every second or third day 4 or 5 drops are to be instilled into the ear, the head being inclined to allow free contact of the medicine with the fundus. This medication is resorted to at intervals after the operation, and the author fancies that it is of service in maintaining, or even increasing, the improvements which result from the operation itself. The detailed histories of 5 cases are given, from two of which we extract the following outlines:—

Case I. Woman, aged 33 years; long history of frequent attacks of otitis since childhood; suffers from deafness; no improvement has resulted from treatment; cranial perception is good; hears best in a noise; tuning-fork at vertex, referred to left; Rinné negative. Hearing: Watch, right ear, 0.02; left ear, 0.02. Ordinary voice, right ear, 0.14; left ear, 0.40. Drum-heads are pale, yellowish-white, very atheromatous, movable, as is also the manubrium; Eustachian tubes pervious; slight increase of hearing after insufflation. *Operation:* Removal of the left drum-head and manubrium. After several months of variation in hearing, serous discharge and varying degrees of inflammation. *The final examination*, made about thirteen months later, is: Hearing for watch, right ear, 0.24; left ear, 0.18. Hearing for moderate voice, right ear, 2.40; left ear, 2 metres. The patient is now able to attend concerts and hear the greater part of the performance.

Case II. Woman, aged 24 years, suffered from otorrhœa in childhood; this caused diminution of hearing, which varies greatly at different times; occasionally there is some tinnitus; hearing is best amid noise; cranial perception is good; tuning-fork at vertex is referred to left side. Hearing for watch, right ear, 0.01; left ear, 0.005. Hearing for moderate voice, right ear, 0.10; left ear, 0.45. Drum-head in left ear has been replaced by a cicatricial membrane; in right ear the drum-head and manubrium are visible; the membrane is somewhat fibrous, movable, as is also the malleus; Eustachian tubes are open. *Operation:* Perforation of the cicatricial membrane in the left ear; no trace of the ossicles could be found. Four months later, the hearing is noted as 0.04 for watch on left side. Two years later, the right drum-head and

manubrium were removed. After eight months, *the final examination* gave: Hearing for watch, right ear, 0.12; left ear, 0.17. Hearing for moderate voice, about 3 metres.

The author has operated upon 17 cases, and has obtained good results in all but 2 cases. In one of these tinnitus was increased, while in the other the results for both ears were negative.

Caries and Extraction of the Incus.—Ludewig, of Halle,³²⁸ _{Dec., '90} reports a second series of 43 cases. He also gives the final results of 32 cases already reported (ANNUAL, 1891, vol. iv, "Oatology," C-26). Of the first series, it is now reported, one year after operation, that otorrhœa returned in 4 cases. Of the cases then recorded as unhealed, 4 have since healed completely; the 2 cases in which paralysis of the facial nerve had been caused by injury during the operation have both entirely recovered; hearing power has increased in 16 cases, decreased in 3, and remained unchanged in 9. The new series of 43 cases gives the present results as follows: The causes of the chronic otorrhœa were, measles, 3 cases; small-pox, 1 case; typhus, 3 cases; scarlatina, 12; unknown, 24. The condition of the ossicles was: malleus healthy, incus carious, in 12 cases; malleus carious, incus carious, in 25; malleus carious, incus uncertain, in 2; malleus carious, incus healthy, in 1 case; failure of attempt at extraction, 3 cases. Results: Otorrhœa was healed in 22 cases; otorrhœa was not healed in 5; still under treatment, 9; unknown, 5; lost, 2; hearing remained unchanged in 19, was increased in 17, and was diminished in 3; condition of hearing unknown in 2; lost trace of, 2.

In the combined series of operations, numbering 75, the incus was found to be carious in 64 cases, *i.e.*, 85 per cent.

Frank Allport¹⁰⁵ _{Aug. 16} speaks most favorably of the removal of necrosed ossicles. He follows the methods used by Sexton, and employs the latter's instruments designed for excision operations. Stacke, of Erfurt,⁵⁷ _{Dec. 21, '90} believes that some of the most satisfactory results of excision operations have occurred in cases suffering from otorrhœa. Unfortunately, in few cases of purulent otitis media is the carious process confined to the ossicles alone, and, therefore, the pus will continue flowing, even after the removal of the small bones. Most frequently the walls of the attic are also carious. Where such is the case, it is of advantage to open this area freely,

connect it with the antrum, and remove all carious masses if the excision of the ossicles has failed to stop the otorrhœa.

To accomplish this free drainage, the author employs a new method, which he has now used successfully in 9 cases. Having removed the malleus and incus, if no more necrosis exists, the operation is ended; but, if indications show the possible existence of more caries, the antrum is to be opened, the lateral masses of bone between the tympanum and antrum removed, as well as the entire posterior wall of the bony auditory canal. These spaces are thus all laid open into one space. The semicircular canals and facial nerve will not be injured if the lateral walls, only, of the antrum are chiseled away. This method is claimed to be superior to that of Küster and von Bergmann, in that it avoids injury to the surrounding parts, and that it does not cause impairment of hearing, since the stapes remains in place. By two incisions along the insertion of the auricle and above it, a triangular flap is made, including the auricle, underlying periosteum, and soft tissues of the auditory canal, as near as possible to the drum-head, where a transverse cut divides the periosteal cylinder, and the flap is pulled forward and held in position. Thus, the middle ear is reached, and can be chiseled, as indicated above. The soft tissues are then replaced and sutured. The incision within the canal heals readily, and the author has never known any stenosis to occur. Afterward, treatment is to be applied to the antrum through the auditory canal. Should the mastoid cells also be diseased, a fistulous opening is to be made into them through the posterior wall of the bony canal, the small flap of skin being turned down on the surface of the antrum, where, having united, its epidermis will tend to hasten the process of healing, cover the surfaces of the enlarged cavities, and form a skin-covered passage between the antrum and auditory canal. This operation does not injure the hearing. The author claims that the operation of excision of the ossicles, as a cure for otorrhœa, will only be successful when performed in connection with this operation, if caries of the walls of the antrum exists, either alone or associated with necrosis of the ossicles.

Somewhat akin to the subject of incision is Dench's ⁶⁶ plan of treatment. He gives report of 4 cases where deafness, the result of otorrhœa, was overcome by simply dividing the cicatrical bands of connective tissue, which caused pressure on the ossicles.

Non-suppurative Catarrh of the Middle Ear.—E. B. Dench, of New York,¹ states that, in estimating prognosis, one of the earliest evidences of disturbance in the conducting mechanism is an alteration of the normal relations of aërial to bone conduction. This begins with the low tones, and, as disease advances, successively affects the transmission of the higher tones. To determine these changes, fine tuning-forks, of octave interspaces, should be employed, instead of the usual single, low-pitched fork. With considerable variation from the normal, as shown by this test, the patient may not manifest great loss of hearing, but, in deciding upon the chances of treatment, the relation of aërial to bone conduction gives more information as to the actual amount of damage than does the degree of impairment of hearing. When bone conduction for all five octaves is better than aërial, the chances of improvement, from anything except operative treatment, are very small. The author employs the usual methods for mobilizing the ossicles and drum-head, hygienic measures, and treatment of naso-pharyngeal disease. As a result of his experience, he regards the new excision operations with favor.

Diagnosis, Prognosis, and Therapeutics of Progressive Deafness from Chronic Non-purulent Catarrh of the Middle Ear.—Gradenigo, of Turin,²⁴ has contributed this important article, in which the late investigations upon this subject are reviewed. This analysis shows that the various conditions producing this form of deafness are really due to one cause, viz., a sclerosis of the mucous membrane within the tympanum or Eustachian tubes, and fibrous changes in the ossicular joints. The path of invasion of these slow inflammatory changes is from the naso-pharynx through the Eustachian tubes. As to determining prognosis, we must observe in each case: (1) if there is functional disturbance in the sound-conducting and sound-perceiving apparatus, *i.e.*, failure to hear by bone conduction, loss of acuteness of perception for high notes, vertigo; (2) if the drum-head is, or is not, retracted. Of the many combinations of subjective and objective symptoms manifested in this condition, the following classifications are made: (a) Great retraction and hyperæmia of the drum-head; watch heard on contact; poor perception for deep tones; continuous or intermittent tinnitus; perception of vibrations at vertex in the most affected ear; sclerosis of the Eustachian tubes; hypertrophic catarrh of

nares and naso-pharynx, with abnormal secretion in quantity and quality; improvement after the air-douche. (b) Drum-head not retracted, but red and shining; constant tinnitus; watch not perceived on contact; vertex vibrations not lateralized; slight alteration within the naso-pharynx, with dry, granular pharyngitis. (c) Drum-head not retracted, but white and thickened; tubes pervious; sometimes persistent tinnitus; no vertigo; watch on contact, *nil*; diminution of hearing, also, for high tones; posterior nares normal; no improvement after treatment. (d) Similar appearances; symptoms more pronounced, and indicate disease of the sound-conducting apparatus. (e) Drum-head appears to be normal; symptoms point to disease of the inner ear; constant tinnitus, with a variety of sounds; vertigo; diminution of hearing for very high tones; Rinné, positive; slight changes in the naso-pharynx.

Cases belonging to the first group are curable, or can be improved. The second and third groups are much graver. In the last group progress is rapid and deafness becomes profound. Care should be observed in not mistaking for the first group (because of temporary improvement) cases which really belong to the last three. It has not been found that any specific micro-organism plays any rôle in the inflammatory changes observed in these conditions, nor does antiseptic treatment give promising results. After trying all forms of treatment, the author has obtained his best results from persistent use of measures which have long been employed in this country, viz., massage of the ossicles by condensation and rarification of the air in the external auditory canal, the air-douche, per catheter, and treatment for diseased conditions of the naso-pharynx.

Electricity in Chronic Affections of the Middle Ear.—W. E. Baxter⁶⁶ has obtained considerable success in causing relief of tinnitus, and improvement in hearing, in some very chronic cases of middle-ear catarrh. These patients had been treated by the usual methods without any signs of benefit. The author is unable to classify those cases of middle-ear affection in which improvement from electrical treatment can be predicted. The "proliferous variety" of otitis has formed the diseased condition in the greater number of cases in which he has used this agent, yet it is believed that other forms of chronic middle-ear inflammation are also to be benefited by this means.

The method of application is as follows: "After placing the patient with the head inclined, the external auditory canal is filled with warm water; the aural electrode, a small wire insulated to within 2 millimetres of its point, is introduced into the auditory canal, and retained there by the fingers of one hand, leaving the other hand free to manipulate the switch, rheostat, and pole charger; the other electrode, one covered with a sponge, is held in the hand by the patient. The current is then switched on and gradually increased, watching the milliampèremeter, until from 5 to 10 milliampères of current are passing through the parts; then, retaining the electrodes in position, the poles are changed two or three times a minute. From three to six minutes is long enough for the application to last. The ear is then dried, the patient kept quiet, for a short time, to recover from the dizziness that is often produced." Applications can thus be made, either daily or on alternate days, over a period of from one to three weeks. The milliampèremeter should always be used to measure the dosage of electricity. If no improvement is noted after the third application, the author does not continue this method of treatment.

Improved Ear Electrodes.—Seth S. Bishop, of Chicago,⁶¹ has devised electrodes consisting of two metal cones, covered with



EAR ELECTRODES.
(*Journal of the American Medical Association.*)

chamois-skin and held in position for treatment by an elastic ribbon buckled around the head (see figure). The tips of the electrodes are to be moistened before inserting them in the auditory meatus. This arrangement is of advantage, (1) because the current can be concentrated, as much as possible, in the ears, instead of being diffused over the sides of the head and face; (2) its use

avoids the necessity of filling the auditory canal with water, and the consequent danger of macerating and relaxing the drum-head; (3) the patient is relieved of the irksomeness of holding the electrodes in position.

Deafness Accompanying Middle-Ear Catarrh and an Affection of the Labyrinth Cured by Pilocarpine.—J. Böke, of Budapest,³⁷ reports a case in which deafness had developed during five months, with vertigo and tinnitus. The air-douche per catheter and medication with potassium iodide failed to produce any improvement. About the tenth day of treatment, a syphilitic roseola appeared upon the forehead of the patient. Pilocarpine was then used subcutaneously. The patient received, in all, about 0.36 gramme (5½ grains) of the drug, and after each injection there was less deafness. At the end of this course of treatment the patient could hear a watch at 30 centimetres and words (in a low voice) at 4 to 5 metres. The author agrees with Politzer as to the usefulness of pilocarpine for aural affections resulting from syphilis, but does not look for any advantage from its use in other diseases of the labyrinth or tympanic cavity.

Epilepsy Dependent upon Aural Disease.—Goris,¹²⁶ reports the case of an epileptic, a young woman, who had suffered from otorrhœa during childhood. The "aura" took the form of tinnitus in the ear from which the purulent discharges had formerly come. The drum-head of this ear was retracted and showed the cicatrix of the old perforation. The manubrium was immovable. Hearing was good and the Eustachian tubes were pervious. The treatment consisted of a course of massage, by means of the pneumatic speculum, together with the use of the sound. Under this treatment, there have been no epileptic attacks during one year, although the treatment has been discontinued for two months and a half.

Cholesteatoma and Inflammation of the Attic.—E. Schmiegelow, of Copenhagen,³⁴⁴ describes 4 cases of inflammation of the attic in which small perforations were found immediately above the short process of the malleus, serving as illustrations of the method of invasion of this tract from the Eustachian tubes and tympanic cavity. Even in cases where perforation of the flaccid membrane has resulted from external injury, *i.e.*, through the external auditory canal, the chances are that the rupture occurred

first in the upper part of the membrana propria. The purulent otitis media thus induced may extend back of Schrapnell's membrane, where retention of secretion finally results in rupture of this membrane as a secondary lesion. Meanwhile the rent in the membrana propria is healed, while that in the membrana flaccida—where chronic inflammation is favored by the anatomical relation of the parts—remains open and continues to discharge. It cannot be denied that inflammatory processes in the external canal, such as eczema, furunculosis, etc., may involve Schrapnell's membrane, and thus be the means of introducing pathological bacteria from the canal into Schrapnell's cavity. The part played by

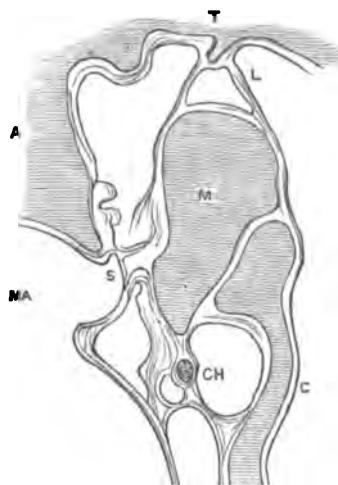
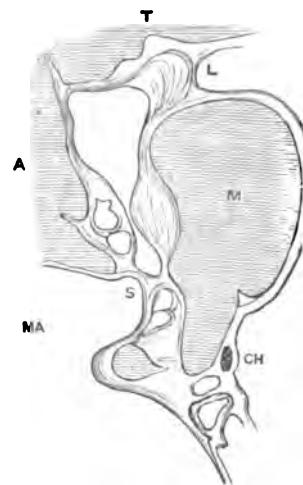


FIG. 1.
SECTIONS OF THE TYMPANIC CAVITY OF A FOUR-YEAR-OLD CHILD.
(*Zeitschrift für Ohrenheilkunde.*)



furunculosis in this process must be very unimportant, as this form of inflammation is, in the vast majority of cases, confined to the cartilaginous portion of the auditory canal and the junction of this with the bony portion. This localization of furuncles is due to the cutis-like character of the tissues covering the cartilaginous part of the canal, while the bony part has a thin periosteum-like covering, protected near the drum-head by cylindrical epithelium. An exception to this latter covering exists in a small triangular spot in the roof of the canal, which is covered with cutis-like tissue. This, however, does not border directly upon the drum-head. Foreign bodies in the external canal are more likely than

furuncles to cause perforation of Schrapnell's membrane from without. The body most liable to cause this is an impaction of cerumen, especially when associated with otomycosis. After the

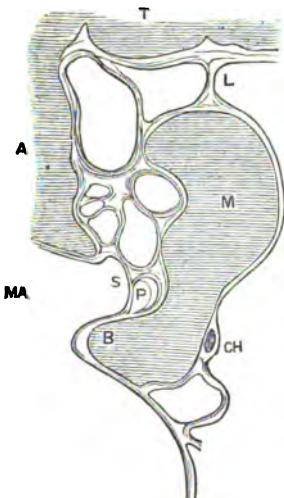
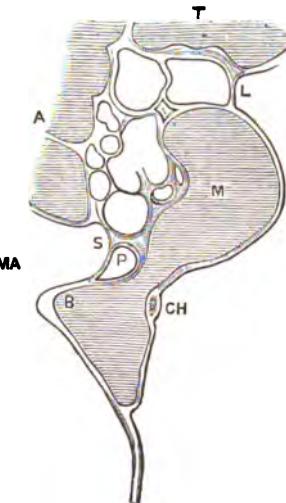


FIG. 3.
SECTIONS OF THE TYMPANIC CAVITY OF A FOUR-YEAR-OLD CHILD.
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removal of such plugs, a wet, ulcerated surface will be found on the walls of the canal, which heals quickly, but which might cause

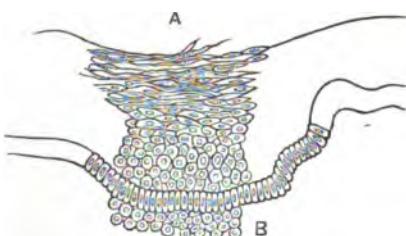


FIG. 5.—SECTION OF MUCOUS MEMBRANE IN
OZÆNA SIMPLEX.

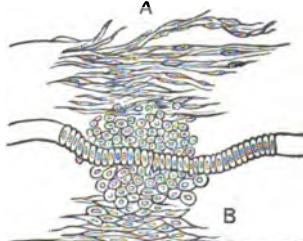


FIG. 6.—SECTION OF MUCOUS MEMBRANE COVERING CAVITY IN MASTOID PROCESS.
(*Zeitschrift für Ohrenheilkunde.*)

Explanation of Cuts.—Figs. 1-4, from sections of the tympanic cavity of a 4-year-old child. Fig. 1 is the deepest section, while Fig. 4 is the most anterior, passing through the point of the short process of the malleus. A, external layer of the tympanic cavity (roof of the auditory canal); T, tegmen tympani; MA, meatus auditorius externus; S, membrana flaccida Schrapnelli; M, caput mallei; C, crus longum incudis; L, ligamentum mallei superium; CH, chorda tympani; P, Prussack's space. Fig. 5.—Section of the nasal mucous membrane in a case of ozæna simplex. A, external layer of mucous membrane; B, subepithelial layer of cells. Fig. 6.—Section of mucous membrane covering a cavity in the mastoid process, filled with cholesteatomata. A, external layer; B, periosteal layer.

involvement of the flaccid membrane, as, for example, in a case reported by Charles Burnett, of Philadelphia. The common path of infection, however, is from the tympanic cavity.

The anatomical arrangement of Schrapnell's space is illustrated by a series of sections, made from the deepest portion forward. These sections demonstrate that, between the head of the malleus, body of the incus, and outer wall of the attic, is a large, single chamber. (See Fig. 1.) Below, this is closed by connective-tissue bands, which pass from Schrapnell's membrane to the head of the malleus. Below this adhesion a small space exists, which is cut off from the tympanic cavity by bands from the drum-head to the long process of the incus. This smaller space, in sections made well forward, is seen to connect with the pear-shaped cavity of Prussack's space, the latter ending in a blind pouch just below the short process of the malleus. In anterior sections, it is also seen that the upper, large space becomes divided into numerous cavities (Figs. 3 and 4), some communicating with one another, while the more posterior chambers open into a single, large space between the lateral walls of the tympanic cavity and the incus. The arrangement bears a striking resemblance to that of the antrum and mastoid cells, and, for this reason, the large, single chamber, lying between the head of the malleus, membrana flaccida, and the tympanic portion of the roof of the auditory canal, could be termed *antrum Schrapnelli*, while the smaller chambers could be named *cellulae Schrapnelli*.

Of these cells, the anterior ones are most liable to become filled with retained secretion, as the posterior cells communicate with the tympanic cavity. For this reason, the anterior part of Schrapnell's membrane—that lying directly over the short process of the malleus—is the portion in which perforations are most apt to occur. As a rule, the space of Prussack is an elongated, trumpet-shaped chamber, with smooth walls, and having the larger opening in communication with the tympanic cavity. It is, when thus formed, less liable to retain pus than are the many small cells lying above it. However, it not infrequently happens that Prussack's space is itself divided into small chambers by trabeculae of connective tissue, thus making it a favorable seat for chronic suppurative inflammation. The cause of chronicity of suppuration within this area does not depend entirely upon the anatomical

arrangements of the parts, but also upon the fact that this suppuration is apt to be complicated by a desquamative process, which tends to fill the cavities with cholesteatomatous masses. The etiology of such masses depends upon an epidermoidal change, which covers the granulating surfaces of the inflamed tissue with a layer of rapidly proliferating squamous epithelium. This layer does not advance from neighboring cutis, as maintained by Bezold, but is analogous to the alterations seen in the nares in cases of simple atrophic rhinitis. This consists in a metaplastic change of the ciliated epithelium into a squamous layer with a true rete Malpighii. Fig. 5 is a section of the nasal mucous membrane taken from a case of atrophic nasal catarrh. Fig. 6 is from the mucous membrane of an aural space containing cholesteatomata. The two processes are thus shown to be quite analogous. The change, thus illustrated, results from the mechanical pressure of the retained secretion upon the underlying epithelium. This alteration of cylindrical epithelial layers into those of squamous type, as a result of mechanical irritation, is a process already well recognized.

Kuhn, of Strasburg,³⁴⁴ in a paper upon the same subject, gives a critical review of the various theories regarding the nature and etiology of cholesteatomata. All but two of these theories can now be excluded: (1) that of Virchow, who regards these collections as heterologous neoplasms; (2) that maintained by many different authorities, that they are secondary products resulting from suppurative inflammation of the middle ear; that the mucous membrane of this part undergoes an epidermoidal degeneration, and, by proliferation of its epithelial layer, finally fills the cavities with this peculiar substance. Much difference is expressed regarding the etiology of this latter process,—Wendt and Lucae representing the authorities who look upon it as a change occurring strictly within the middle ear, while Habermann and Bezold regard it as an ingrowth of the cutis from the auditory canal and drum-head, which, in time, takes the place of the normal mucous covering, and thus produces the epidermoidal change. As a proof that Virchow's theory is not incorrect, although it may not account for all examples of cholesteatomata, the author cites a case from his own experience. The patient, a healthy and intelligent man, had never suffered from any form of ear disease. During the

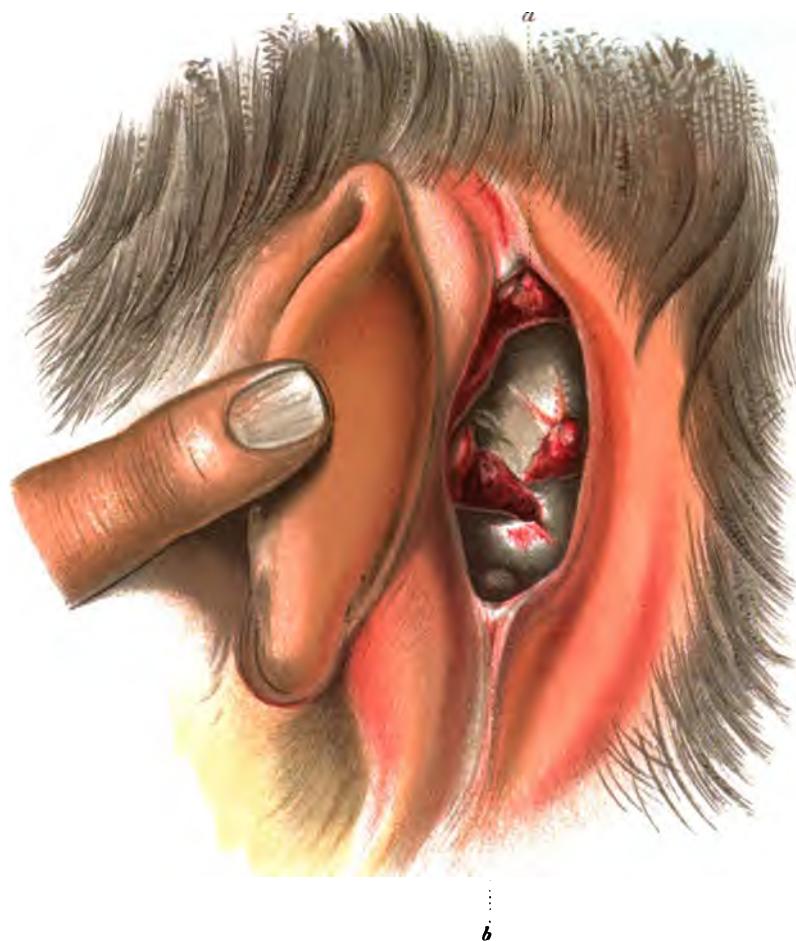
year preceding his reported illness, he noticed a steadily-increasing degree of tinnitus in the left ear, accompanied, later, by increasing vertigo, and, finally,—induced by exposure to cold in a snow-storm,—intense pain in the left ear and side of head. A few days later, very foul-smelling pus began to flow from this ear. The left mastoid process became tender, swollen and inflamed. A large, soft spot, indicating fluctuation, occupied the centre of this swelling. A fistulous tract was seen in the posterior wall of the left auditory canal, from which pus exuded, and a small perforation was noted in the anterior inferior quadrant of the drum-head. Upon opening the mastoid abscess, it was found that the entire external wall of the cells yielded to the chisel. It was removed, and a large, single cavity became visible, filled with a cholesteatoma, solid and almost dry, and about as large as a hen's egg.

Removal of this mass revealed the exposed dura mater of the cerebellum, thickened and pulsating. The cavity was as large as a child's fist, and was lined with a thin, white, glistening membrane. Under treatment the parts healed, and within four weeks the patient left the hospital. A section of the lining membrane of the cavity showed it to consist of several layers, divided into periosteal and epithelial layers (see Plate, Figs. 2 and 3). The periosteal layer is without blood-vessels, and is composed of elastic fibres, many bundles of which run at right angles to the bone (Fig. 3). The outer periosteal layer is united with these fibres, contains numerous blood-vessels, and is composed of connective-tissue bundles set in different directions, but having a general parallel arrangement. Above this, in a third periosteal layer, comes a cystogenic membrane containing numerous round cells. Next comes the epidermal layer, resembling the rete Malpighii and horny layers of the cutis. The epithelial cells change in form from cylindrical ones, in the deeper layer, to round, and then oval, toward the surface. The outer layer of all consists of horny, polygonal pavement-cells (Fig. 4).

Explanation of Plate.—Fig. 1, *a* and *b*: Natural size of the cavity in the mastoid process. Fig. 1, *b*, illustrates the depth of this cavity. Fig. 2: Section of bone-tissue, with large and small cavities, in which are found connective-tissue, periosteum, rete Malpighii, and layers of horny cells. Fig. 3: Section of periosteum and cutis-membrane. Fig. 4: Polygonal cells from the horny layer of section, Fig. 3.

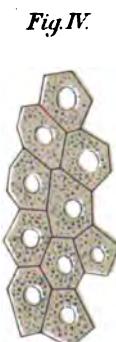
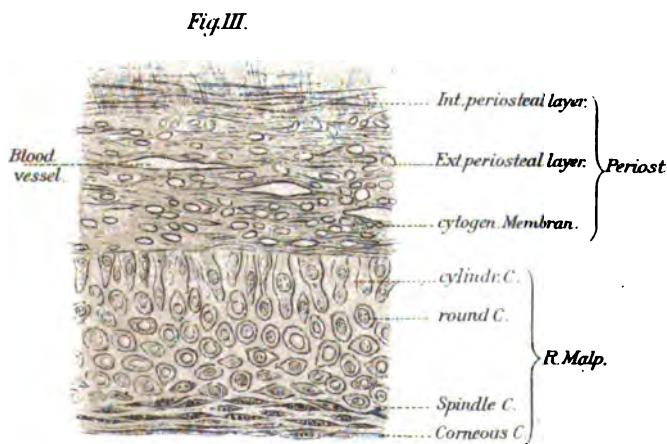
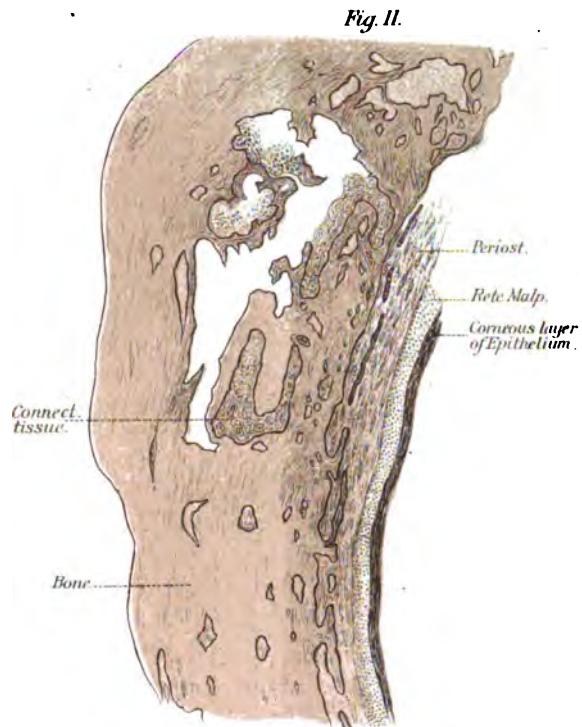
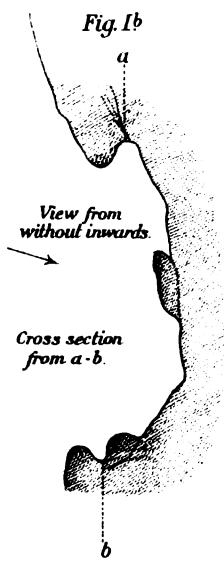
In an article on cholesteatomata of the ear, Bezold, of Munich,³⁴⁴ reiterates his already well-known theory that cholesteatomata

Fig. 14



Cholesteatoma (Kuhn).
Zeitschrift für Ohrenheilkunde





Cholesteatoma (Kuhn)
Zeitschrift für Ohrenheilkunde.



result as secondary products from inflammation of the middle ear, and are caused directly by an ingrowing of the epidermis from the external auditory canal and drum-head, and a gradual conversion of the mucous membrane into an epidermoidal covering, whose desquamated cells, in time, fill the cavities of the middle ear and mastoid spaces. A close relationship exists between tubal catarrh, perforation of Schrapnell's membrane, and these cholesteatomata. Since scientific attention has been directed to these cases, it is observed that such cases are found far more frequently than formerly, and the relationship between such growths and perforation of the flaccid membrane is clearly shown by a long series of cases. Both conditions are found twice as frequently upon the left side as upon the right side of the head. This is to be accounted for upon the anatomical ground that the right sigmoid sulcus is decidedly deeper than that of the left side. As a consequence of this lesser development of the left sulcus, the pneumatic cells upon the left side are more numerous and fully developed than upon the right, and so present a larger surface for inflammatory action and for the deposit of the products of inflammation. The course of suppuration in the two series of cases examined—one of cholesteatomata and one of Schrapnell's perforation—corresponded very closely, as did, also, the ages of the patients. More than one-third of the cases of perforation of Schrapnell's membrane had been complicated by, or still presented the symptoms of, tubal catarrh; but much less frequently was this the fact in cases of cholesteatomata without perforation of Schrapnell's membrane. Treatment for cholesteatomata consists in the removal of these growths, the accompanying polypoid masses being curetted away or removed by snares. Hartmann's cannula is of special use in removing the masses, which, when very firm, can be softened by weak solutions of liquor ammonium. Four-per-cent. boracic-acid solution is to be used for washing them away. It is, at times, necessary to enlarge the opening to the antrum by the removal of the malleus and incus. Especially excellent is said to be the insufflation of boracic-acid powder directly into the cavities from which the masses have been removed and their walls thoroughly dried. A short, curved tube, about the size of a tympanic cannula, is a useful instrument for making these insufflations. Iodoform can be used in place of boracic acid, if the latter causes eczema of the external

auditory canal. Prophylactic measures should invariably be employed, during childhood, by effecting the rapid cure of existing tubal catarrh, or the removal of adenoid vegetations from the naso-pharynx.

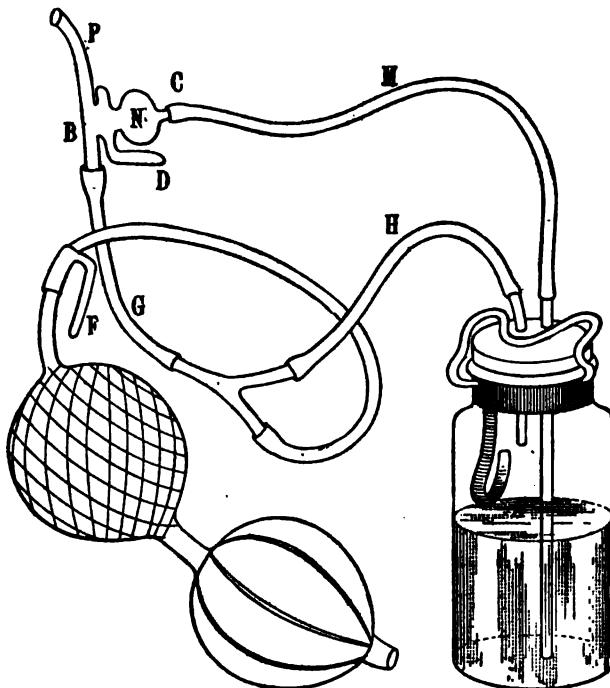
Gruber,²⁸³ referring to treatment of perforations of Schrapnell's membrane with otorrhœa, advises that, if there is obstruction to the free discharge of pus, the perforation should be enlarged. All retained secretion must be removed and granulations curetted away. The parts are to be rendered as nearly aseptic as possible, by the use of salt solutions and 1-per-cent. corrosive-sublimate solution. The cavity in the attic is then to be packed with iodoform gauze or bichloride gauze, the packing being supplied with a string, and set in place by means of Gruber's pincette. This dressing is to remain in place for from five to eight days, or until it is saturated with discharge and becomes foul-smelling, or until pain and fever are manifested.

Suppurative Catarrh of the Middle Ear.—Milligan²⁹ gives an analysis of 300 cases of suppurative otitis media chronica. Of these 300 cases, 72, or 24 per cent., resulted from scarlatina; 27, or 9 per cent., followed measles; 37 cases were due to naso-pharyngeal catarrh; 4 cases resulted from blows on the ear; 11 cases originated during the first dentition; 7 cases were due to tubercular disease of the mucous membrane, the patients, at the same time, suffering from pulmonary or laryngeal phthisis; 3 cases developed after the entrance of salt water into the ear; 1 case originated during an attack of pertussis; 137 cases are recorded as resulting from "colds in the head." The ages of these patients varied from 9 months to 72 years, and the duration of otorrhœa from 6 months to 20 years. In 50 per cent. of the cases polypoid granulations were found, and in 18 per cent. diseased bone was discovered. The hearing power varied enormously, and without any apparent relation to visible lesions.

In studying the frequency of otitis as a result of scarlatina, Caiger,³⁰ has collected the records of 1008 cases of this disease. Otitis occurred in 125 cases, or 12.9 per cent. It was most frequent in very young children. A direct connection seemed to exist between the severity of the attack of scarlatina and the early development of this complication. In mild cases, there was either total immunity from otitis, or, when developed, it appeared at a late

period of the primary sickness. Mastoiditis developed in 3 cases only, and there was no pyæmia or meningitis.

Injections of Fluid into the Middle Ear Through the Eustachian Tube.—This form of medication is a favorite means of treatment with some authorities, and is regarded as a most efficient means of cleansing the middle ear of retained secretion. Adolf Bronner²⁸ has devised the apparatus illustrated in the accompanying cut as a useful instrument for this purpose. It consists of a catheter, P,

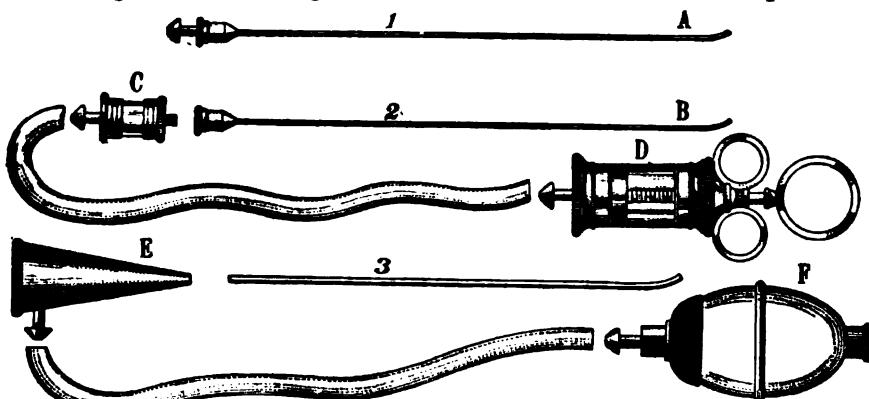


INJECTION OF FLUID INTO THE MIDDLE EAR.
(*Provincial Medical Journal.*)

with two ends, B and C, one of which can be closed by a valve, D; of a bottle, A, and of a Lucae modification of Politzer's bag, with hook. These various parts are connected by India-rubber tubing, G, H, and M. The bottle and Lucae's bag are attached to the surgeon's coat by the hooks, A and F, and the catheter introduced into the nostril. At first the valve, D, is closed, so that all the air passes into the catheter through the end, B. The valve is then opened, and part of the air passes through the end, C, coming from the bottle. A fine spray of the fluid contained in the bottle is thus

produced, and passes through the catheter into the Eustachian tube. By gentle pressure on the tube, G, we can easily regulate the density of the spray. The more we compress the tube, G, the more air passes through the tube, H, into the bottle, and the denser the spray becomes. The solutions used are either a 2-per-cent. boracic-acid solution or a 1- to 3-per-cent. aluminium acetico-tartaricum.

Instruments for Cleansing and Applying Medicated Fluids and Powders to the Middle Ear.—Joseph A. Andrews, of New York, ¹⁸⁸⁰ has devised a series of cannulae for this purpose. No. 1 is for the passage of fluids from the syringe, D. The syringe is to be worked by the patient, so that the physician's hands are free. The long rubber tubing enables this to be done, and also prevents



INSTRUMENTS FOR CLEANSING AND APPLYING MEDICATED FLUIDS AND POWDERS TO THE
MIDDLE EAR.
(*London Lancet.*)

contusion, which often occurs when the cannula is attached directly to the syringe. No. 2 is intended for the withdrawal of fluids from the tympanic cavity. By means of its cylinder, C, it is possible to see the character of such fluids. No. 3 is used for the insufflation of medicated powders. E is the receptacle for holding these powders, which can be forced into the ear by compressing the rubber bag, F. These cannulae are made of sterling silver or of aluminium. The series of instruments are of especial advantage in treating suppurative disease of the attic, or region of the membrana flaccida.

Treatment of Chronic Purulent Inflammation of the Tympanic Mucous Membrane by the Transplantation of Cutis.—Berthold ¹⁸⁸¹ lays stress upon the necessity of placing the grafts of cutis upon

mucous membrane, which is free from moisture. If the tympanic wall is persistently covered with discharge, this must be removed by means of dry cotton, and the mucous surface then touched with cotton, slightly moistened in a solution of the sesquichloride of iron. If the mucous membrane remains dry for twenty-five hours after this application, the grafts can then be made; if not, the use of the astringent must be repeated. Care must be observed that there is absolutely no bleeding-point on the mucous surface. The grafts are best taken from the skin of the arm. They must be very thin, not including more than the superficial layers of the cutis.

Peppermint-Oil for Suppurative Middle-Ear Catarrh.—Pientkowski³⁵⁷ claims that he has obtained good results from the use of 5 to 500 parts of English peppermint-oil in absolute alcohol. The ear is to be cleansed with a 5-per-cent. solution of sodium sulphate. The mint mixture is then injected freely into the ear, and a cotton pledget moistened with this solution is placed in the fundus and retained there until the following day. The author states that he has cured many very obstinate cases of otorrhœa of long standing by this method of treatment.

Styrone in Otorrhœa.—James Spaulding, of Portland,³⁶⁸ has had much success from the use of this substance, largely diluted with alcohol (1 to 5 per cent.). Its deodorizing and disinfecting properties are soon manifest, and it is of especial service in obstinate cases, when perforation of Schrapnell's membrane exists. The solution can be applied by means of a syringe, dropped into the patient's ear, or used for moistening cotton pledgets, which are inserted into the auditory canal.

Trichloride of Iodine in Otorrhœa.—Trautmann³⁶⁹ strongly recommends the use of 5-per-cent. solutions of this substance. It is to be injected into the ear by means of a glass syringe with asbestos packing,—an instrument devised by Trautmann. This application can be made once daily, but, usually, once in four days will suffice. It causes a slight burning sensation, which disappears in the course of an hour. Trautmann has obtained excellent results from its use, especially in cases complicated by the presence of adherent, desquamated epithelium, and where cholesteatomata exist. When granulations are found, these must be destroyed by galvano-cautery applications, curetting, etc., and, after

twenty-four hours, the iodine-trichloride solution can be used with most satisfactory effect. It is of much service after the removal of ossicles. In acute purulent otitis Trautmann has not yet employed it; but in cases of furunculosis it acts well not only in hastening the disappearance of the furuncles, but in preventing their recurrence.

BACTERIOLOGY.

The relation of micro-organisms to catarrhal inflammation of the middle ear, and their complications, is the subject of a review by Moos, of Heidelberg.¹⁰¹ The combined investigations of authorities, including his own work, indicates the important rôle played by such growths in the production and course of aural disease. In all the various stages of inflammation of the middle ear, three micro-organisms are found as the chief offenders,—the streptococcus, the different forms of the staphylococcus, and the pneumo-diplococcus. Their paths of invasion are: 1. By the blood-vessels. 2. By the Eustachian tube, both directly and indirectly. 3. Through the drum-head. This latter course of ingress may occur even when the drum-head is intact, as shown by a report of a case of erysipelas of the head, where the erysipelatous process, advancing through the auditory canal, caused an inflammation and rupture of the drum-head, and thus reached the middle ear. 4. The micro-organisms may also invade the middle ear from the cranial cavity, through the petro-squamous fissure. The lesions caused by micro-organisms are: 1. Simple, non-purulent catarrh of the middle ear. A mucoid degeneration of the protoplasm of cells is produced. This process does not, of itself, advance to suppuration, yet, without treatment, there may be formed an enormous quantity of a serous exudate, which may even extend into and fill the cells of the mastoid process. Suppuration may be induced, in such cases, by "cold," or by insufflation of air through the tubes. 2. By the escape of microbes from the vessels an infiltration of the mucous membrane may occur, with the addition, also, of many polymorphous, wandering cells. This process occurs in measles, scarlatina, and primary diphtheria of the nose. As a result, there is the production of a fibrous net-work, which, as in scarlatina and measles, may cover the entire mucous membrane. Associated with it, there may occur erosion of blood-vessels, necrosis of the cochlea, destruction of portions of the walls

of the labyrinth, and rupture of the round window. 3. The formation of pus. This process may cause merely rupture of the drum-head, or it may produce a panotitis, with extensive caries and great destruction of tissue.

Complications of purulent middle-ear catarrh include thrombosis of the lateral sinus, paralysis of the facial nerve, cerebral abscess. The most common complication is mastoiditis. The streptococcus seems to be the most active microbe in all carious processes, and, in these, appears in greater number than do the other forms. This is true even in tubercular inflammation. This peculiar micro-organism passes directly through the walls of blood-vessels, causing thrombosis and pyæmia, and may be a causative element in cerebral abscess. In tubercular otitis, the bacilli find ingress to the tympanum directly through the Eustachian tube, or, indirectly, by the periosteal vessels of the tube. The onset of pain in this form of otitis does not begin until the streptococcus, as well as the specific bacillus, invades the parts. From this time, the carious process advances with great rapidity. The presence of streptococci appears to have the effect of diminishing the number of bacilli.

Bacteriological Examination of the Contents of the Tympanic Cavity in Cadavers of Newborn and Young Infants.—Gradenigo and Penzo³⁴⁴ have made an investigation upon 10 children, varying in age from the seventh month of intra-uterine life to the age of 1 year and six months. The lesions found in the middle ear were all suggestive of inflammatory processes, and corresponded with those seen by other investigators, which were regarded as the result of severe inflammation. However, all the micro-organisms found by Gradenigo and Penzo were saprophytic and not pathogenic, nor did any of the 10 children die from diseases commonly complicated by otitis media. The authors conclude, therefore, that the changes very often observed after death in the tympanic cavities of newborn or suckling infants are due to rapid decomposition instead of inflammation.

THE HEIGHT OF THE ATTICUS TYMPANICUS.

C. Klingel, of Berlin,³⁴⁴ has conducted a series of measurements upon 47 temporal bones, for the purpose of learning the height of the attic roof. His instruments consisted of fine wires with ends bent at right angles, the short arm thus formed

varying in length from 1 to 8 millimetres. Politzer had already announced that the distance between the head of the malleus and the tegmen tympani was 5 to 6 millimetres. Klingel made his measurements from the summit of the fissure of Rivinius to the roof of the attic. His results are: In 6 cases, 3 millimetres; in 6 cases, 3 to 4 millimetres; in 17 cases, 4 millimetres; in 9 cases, 4 to 5 millimetres; in 7 cases, 5 millimetres; in 2 cases, 5 to 6 millimetres. If Politzer were correct, Klingel should have found that the distance between the head of the malleus and the tegmen tympani, at this point of measurement, was 7 to 8 millimetres. As a fact, 4 millimetres was the measurement in the largest series of his specimens (17), 3 millimetres was the smallest measurement. As a practical point, it thus appears that any instrument, such as used at Halle, or by surgeons elsewhere, for removing the incus, and whose hook is from 4 to 5 millimetres long, may come in dangerous contact with the attic roof. Indeed this may occur if the short arm be longer than 3 millimetres. The danger is all the more worthy of consideration when it is remembered that this roof is of extreme thinness, that it is often defective, and that, consequently, there is the possibility of wounding the meninges or substance of the brain.

LUPUS AND TUBERCULOSIS OF THE MIDDLE EAR.

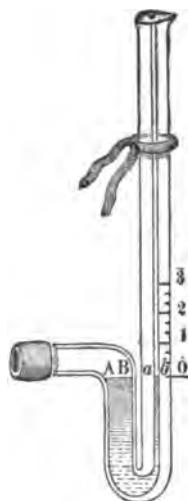
Only 1 other case of lupus in the middle ear has been reported—a case of Gradenigo³⁷—previous to the present case of Ouspenski,³⁸ the details of which follow: The patient was a peasant boy, 18 years of age, who was attacked with primary lupus of the nose. Subsequently, he began to suffer from otorrhœa, which disappeared. He was afterward treated by injections of Koch's lymph. After the second injection, he experienced severe pain in the ear, and the discharge re-appeared. Examination, after the eleventh injection, revealed a drum-head, dry and thickened, having a round, irregular-bordered perforation in the lower portion. The discharge from this ear had contained tubercle bacilli. The reporter, Ouspenski, believes that the disease extended to the middle ear through the Eustachian tube.

Schwabach³⁹ has used injections of tuberculin in 10 patients suffering from otorrhœa. Nine of the patients had pulmonary tuberculosis, and one patient had tubercular disease of bone.

General reaction followed the injections in all cases except one. The local reaction was shown by pain above the ear, tinnitus, and increase of discharge. In 6 cases there was no change after treatment; in 3 the symptoms were aggravated. One case, in which tubercle bacilli were found in the pus from the ear, was cured. On the whole, the results of this treatment were not encouraging.

THE ENDOTOSCOPE AS A MEANS OF DIAGNOSIS.

Gellé's endoscope, ⁸⁷ here illustrated, consists of a tube which is filled with clear water in its U-shaped part. The short, right-angled arm fits into the auditory meatus, while the long arm is tied to the patient's head by means of the fillet. Pulsation in the middle ear is transmitted to the fluid, and the vibrations, made all the more marked by the diminishing calibre of the tube, are plainly indicated along a scale cut on the longer arm. It is claimed that this instrument will indicate the blood-pressure within the tympanic cavity. During an active congestion of the mucous lining, or of granulation tissue, this instrument shows pulsations synchronous with the pulse. This examination is especially useful when there is a failure of objective symptoms. With the disappearance of congestion the pulsations in the endoscope cease, but are manifested as long as any abnormal vascularity persists; thus, it is claimed that the instrument can render important service in estimating the prognosis in chronic aural affections. It is claimed that the absence of pulsations in the endoscope, while, at the same time, subjective symptoms are noted in the ear, indicating some congestion, enables the observer to locate the seat of inflammation in the deeper parts of the ear, or else to diagnose them as resulting from some neurosis.



GELLE'S ENDOTOSCOPE.

A, B, level of the liquid in the large tube, the calibre of which is five times larger than that of the small tube. a, b; 0, level in the vertical, graduated tube.

(*Annales des Maladies de l'Oreille, etc.*)

DISEASES OF THE MASTOID.

Opening the Mastoid Process.—Th. Heiman, of Warsaw,⁸⁴⁴ gives the following indications for this operation: (1) in acute otitis

media with involvement of the mastoid, when the usual symptoms are not overcome by the simple methods of treatment, ice, leeches, and Wilde's incision; (2) in acute and chronic purulent inflammation of the middle ear, when drainage is prevented by granulation tissue or by narrowing of the auditory canal, and, at the same time, the mastoid process becomes swollen, red, and painful; (3) even when the mastoid is normal, if the removal of pus or cholesteatomata cannot be thoroughly accomplished without this operation; (4) for abscess and fistulae of the mastoid process; (5) for obstinate and constant pain in the mastoid, especially pain on pressure, unrelieved by any other treatment, even though retention of pus is not indicated and the parts appear healthy; (6) as a prophylactic operation, to accomplish drainage and prevent fatal blood-poisoning, in cases in which it is threatened during an attack of mastoiditis, or when there have been signs of retention of pus; (7) during acute, purulent inflammation of the middle ear, although no mastoid involvement or retention of secretion is indicated if the discharge is very profuse, is not overcome within two or three weeks by simple treatment, or becomes worse, especially if fever is indicated; (8) in case of positive symptoms of cerebritis or meningitis. The operation should be performed by otologists, and not be entrusted to general surgeons. The accepted method is by chisels and hammer, but trephines offer the advantages of more rapid work, better edges for the bony opening, easy enlargement of a wound, less danger of shock, and certainty as to the depth of the wound. For work upon the cellular tissue of the mastoid, a sharp curette or spoon is the most useful form of instrument. For giving drainage to a cerebral abscess, the trephine is to be preferred as the instrument for opening the skull.

Opening the Mastoid from the External Auditory Canal.—Hassler, of Halle,⁸⁴, recommends that Schwartz's method should be used at the beginning of an operation, but, if caries extends over the squamosa, resort should be had to von Bergmann's method of chiseling over the canal and removing its superior and posterior walls.

Closure or Non-closure of Wounds after Mastoid Operations.—Kretschmann, of Magdeburg,⁸⁴, advises against closure in all cases of a purulent character. Here the wound should be packed and the bandage remain untouched for five or six days. The

second dressing must be more promptly removed, within two or three days, owing to increase of discharge.

Primary Periostitis of the Mastoid.—Würdemann, of Milwaukee,⁶¹ reports 2 cases of this rare form of mastoiditis. Both patients were cured by performing Wilde's incision and the use of antiseptic packing for the wound.

The Leiter Coil for Mastoiditis.—Gorham Bacon, of New York,¹⁰ calls attention to the advantages of applying cold to the mastoid by means of Leiter's coil. He quotes favorable comments upon this instrument from Politzer and Thomas Barr, of Glasgow. Its employment will usually relieve the inflammatory symptoms. However, if the temperature of the patient continues to rise, it will be necessary to resort to leeches, cupping, incisions, or the trephine, even though pain may have been overcome by the coil.

Harry Friedenwald, of Baltimore,⁶⁰ reports a *case of extensive caries and cholesteatoma of the mastoid process without local signs of inflammation. Death from thrombosis of the lateral sinus and meningitis.* The patient, a young man, had suffered since childhood from chronic otorrhœa, the result of measles. During the course of his life he had had several attacks of vertigo, one of which occurred during an attack of periostitis of the mastoid process. The symptoms which led him to begin treatment were excessive dizziness and pain in the left ear. The only objective symptom was a slight prominence of the left ear, a point of slight tenderness on pressure over the auditory canal, and the occlusion of the canal with offensive pus. The fundus of the left ear was filled with polypi. Treatment extended over three weeks. Removal of the polypi did not relieve the symptoms, but, under the use of mercurial inunction, leeches to the ear, and atropine, the pains disappeared and the patient became apparently well. One month later, he began to manifest symptoms which led to the diagnosis of malarial poisoning; chills, diarrhœa, pains in the limbs, exhaustion, drowsiness, sweating. Quinine gave no relief. There was nothing to indicate cerebral abscess or thrombosis of the lateral sinus. The patient's condition continued to grow worse during the month which followed.

There were no objective signs of mastoid disease, except some pain on pressure over this region. Temperature was 104° F. (40° C.). There was great prostration and intense pain in the

head. Cerebral abscess of the left temporal lobe was believed to exist, and an operation was attempted for its drainage. Von Bergmann's landmarks were followed,—“From a point four centimetres behind the external auditory canal, in a line with the lower margin of the orbit, ascend perpendicularly for five centimetres, to reach the point for trephining.” No abscess was found. The wound was closed and the mastoid was then opened. A circular opening was found on its surface, which led into a large space filled with a cholesteatomatous mass. The cavity communicated freely with the external auditory canal. During three days succeeding the operation the patient grew rapidly worse, and died on the third day.

Post-Mortem.—There was no cerebral abscess. A greenish layer of pus covered the convex surface of the left frontal and

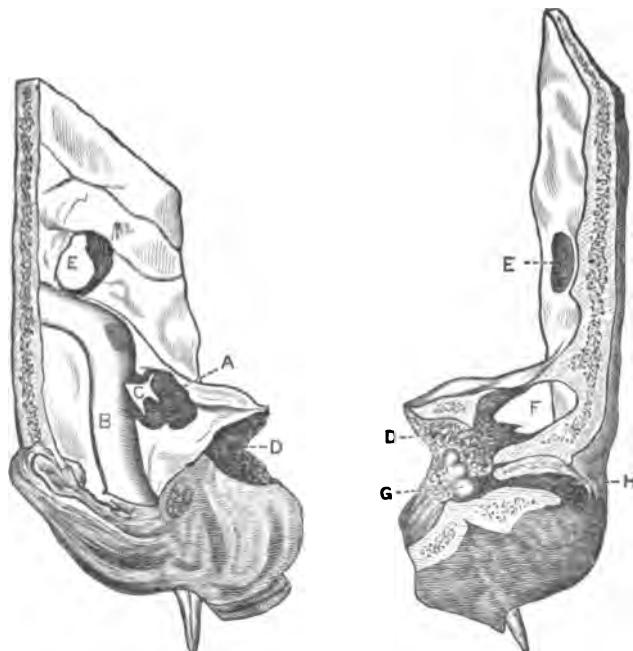


FIG. 1.—TEMPORAL BONE. (Inner side seen from behind.)

(*Archives of Otology.*)

FIG. 2.—TEMPORAL BONE. (Anterior view.)

parietal lobes. The external opening, 5 centimetres in diameter, at the base of the mastoid process (Fig. 1, C), led directly into the interior of the skull by a rough, irregular opening, 1 centimetre in diameter (Fig. 1, A). The circumference bordered immediately upon the lateral sinus (Fig. 1, B), in which was a firm thrombus,

12 millimetres by 3 millimetres. The dura, here, was thickened, but intact. The thrombus was a cholesteatomatous mass. Only the upper part of the mastoid process was affected. The large cavity, 2 centimetres in depth, found here, extended forward between the external auditory canal (Fig. 2, H) and the base of the middle cranial fossa, the latter being converted into an exceedingly thin plate of bone (Fig. 2, F). Extensive caries existed behind and above the tympanic cavity (Figs. 1 and 2, D), the carious part joining the cavity of the mastoid. Three polypi (Fig. 2, G) are seen attached to the upper, outer wall of the tympanic cavity. Fig. 1, E, marks the opening in the bone made by the trephine, and corresponds to the lower, posterior margin of the temporal lobe at the termination of the fissure of Sylvius.

The case is of interest on account of the lack of symptoms pointing to mastoid disease; the absence of all decided pyæmic symptoms until late in the course of the disease; the periods of apparently good health during the long continuance and progress of grave pathological changes. The cholesteatoma in the lateral sinus is supposed to have advanced by direct extension of the growth from its cavity in the mastoid, through the ulcerated walls of the sinus.

INTERNAL EAR.

A Case of Bilateral Apoplectiform Deafness.—Ferrier, of King's College Hospital, ⁶ reports the case of a man, 36 years of age, in whom total deafness in the right ear immediately followed the sound as of an explosion in the head. Eighteen months later, while at work, this patient heard a crash within the head, became unconscious, and has since been totally deaf in the left ear. The ear appears to be normal on examination; there are no symptoms of paralysis in any part of the body, or of want of co-ordination of movement. The patient's health has been excellent, except during an attack of syphilis, fourteen years ago. Deafness did not improve under treatment. The case is regarded as one of haemorrhagic effusion into the labyrinth, without any cerebral involvement.

The Employment of Pilocarpine in Certain Affections of the Ear, and the Abuse of this Remedy.—Politzer ⁶ states that subcutaneous injections, beginning with 2 drops of a 2-per-cent. solution and increasing to 8 drops, are of great service in all recent affections of the labyrinth. From 10 to 15 injections

ought to produce the results aimed at; if not, the remedy is to be abandoned. The remedy is not of service in acute otitis media, or in otitis due to infectious diseases; it is contra-indicated in dry, sclerotic catarrh of the middle ear. Injections of several drops of a 2-per-cent. solution are to be forced through the catheter and Eustachian tube into the middle ear, in certain subacute cases of middle-ear catarrh, this procedure being carried out in connection with simple inflation. Archibald Macdonald¹⁵⁷ gives a report of a patient, a man of middle age, who had been slightly deaf for a long period. During the epidemic of *la grippe*, he suffered from this infection, after recovering from which he was completely deaf. He could hear the "A" fork by bone-conduction. Treatment consisted of 10 drops of jaborandi, in water, three times daily. This medicine was taken for eight days without any effect; then $\frac{1}{4}$ grain (0.011 gramme) of pilocarpine was given hypodermatically. This dose was increased to $\frac{1}{2}$ grain (0.016 gramme). Three doses were given, on alternate days, and resulted in restoration of the patient's hearing.

Evil Effects following the Unskillful Use of the Aural Syringe.

—Bremer¹⁶⁰ reports a case of meningo-encephalitis, probably arising from a subdural abscess, in which death was caused, or hastened, by injudicious use of the syringe. This procedure had been entrusted to members of the patient's family.

Loss of Consciousness following Traumatism to the Ear Relieved by Insufflation of Air into the Tympanic Cavity.—Bayer, of Brussels, v.10, p.600,¹⁶¹ gives the details of this remarkable case. The patient, a man about 23 years old, appears to have been peculiarly subject to nerve-impressions, much resembling the temperament of a hysterical woman. During a horseback ride he received a sudden shock, having been thrown into the air and bounced down on his saddle. He experienced, immediately, a sensation as if something had been displaced in his ear; he was obliged to dismount, and, a few moments later, lost all consciousness. When seen by Bayer, the patient lay quietly in bed, his eyes closed; at times he was excessively restless and delirious. He frequently put his hand to his left ear and groaned. When called by name, he opened his eyes, but evidently did not recognize his surroundings. The pupils were equal and reacted normally; pulse was slow; temperature was not increased. The drum-head appeared to be normal, except for the fact that it was somewhat dull in color.

The existence of exudation in the tympanum was suspected, but, before making an exploratory paracentesis, the ear was insufflated, a catheter being used. After the first inflation with air, the patient opened his eyes and regained consciousness. For several weeks afterward his memory was feeble, and he was excessively irritable. A second attack of loss of consciousness very nearly resulted from a ride in a street-car, ten days after the recovery of consciousness. The patient eventually made a satisfactory recovery. The lack of probability, in this case, of cerebral concussion from shock transmitted along the spine; of effusion into the cerebral ventricles or labyrinth; the patient's neurotic temperament; his sensation at time of injury, viz., as of a displacement within the ear; his ability to dismount, and his far from immediate loss of consciousness, led Bayer to consider this case as one of loss of consciousness from auto-suggestion. The auto-suggestion was based upon certain disagreeable sensations in the ear, caused by sudden depression of the drum-head and closure of the Eustachian tube. Insufflation sufficed to dispel aural sensations, and the patient allowed himself to recover consciousness.

HEARING.

Tests for Hearing and a Uniform Record for Degrees of Deafness.—Schwabach, of Berlin, ⁸⁴ _{Sept. 12} does not find that any of the tests—at present used—can give indications that will lead to the positive location of aural lesions. The diagnosis, in every case, can only be formed by reviewing, collectively, the patient's history, the objective appearances, the clinical course, and the tests with the tuning-fork. Lucae, of Berlin, during the discussion of Schwabach's paper, laid stress upon the usefulness of employing pipes, as well as tuning-forks. He had observed cases in which deep tones were not perceived when produced by the tuning-fork, but even the same tones were heard when made by the pipe.

Automatic Hammer for the Tuning-Fork.—S. S. Bishop, of Chicago, ⁶¹ _{June 20} has devised a tuning-fork especially adapted for accuracy of examination. The hammer and operating spring can be attached to any large tuning-fork. In determining the hearing, the same rules are observed as when the watch is used. Every time a sound is produced the hammer-handle should be pressed down to touch the handle of the fork, so that, as it is allowed to slip from under the pressure of thumb or finger, the head of the

hammer strikes the fork with unvarying blows. Much variation will be found between the distance at which the musical note of the fork is heard and the dull percussion sound of its vibration. Bishop has found this device indispensable for precision in aural practice.



BISHOP'S AUTOMATIC TUNING-FORK HAMMER.
(*Journal of the American Medical Association.*)

Fiske¹¹⁵ favors the use of *the phonograph as a test for hearing*. Some objections to this instrument are: 1. The volume and quality of the voice differ from those of the human voice, and there is loss of force in transmission. Yet the volume of sound can be relied on for a record at a distance of 40 feet, while the human voice, which it imitates, can be recognized immediately. 2. There is some danger that the patient may lose his phonogram. A duplicate should be made and retained by the physician. 3. Variations in different machines. This can be detected by careful comparison of a large number of instruments.

Influence of Sex upon Disease of the Right or Left Ear.—Loewenberg, of Paris, ¹⁸⁹⁰ from an examination of 3000 patients, 1790 men and 1210 women, has found that one-sided deafness occurs, in the case of men, most frequently upon the left side; in women, on the right. When both ears are deaf, the left is the most affected of the two, in men, while this difference is not so marked in women.

MISCELLANEOUS.

Otalgia.—Blake ^{Aug. 13}¹¹⁶ divides the neuroses of the ear into two classes,—persistent and intermittent. The former class, in the external ear, includes cases of hyperæsthesia, such as are associated with the nervous manifestations of neurasthenics. This constant pain is located, most frequently, in the external auditory canal and upper anterior part of the concha. It varies with the general condition of the patient, being worse during periods of physical depression. It is relieved, for the moment, by protection of the parts, but disappears only with the improvement of the patient's general state.

Continuous pain of the middle ear occurs, often, independently of other neuralgic symptoms. It is most frequently an indication of reflex irritation, the origin of which may be a carious tooth, or from disease within, or irritation of, the nares or larynx. Intermittent otalgia externa is commonly located in the auricle and posterior part of the auditory canal. It rarely occurs independently of other neuralgic manifestations, and is especially frequent with neuralgia of the occipito-parietal region. The same is true in regard to intermittent otalgia of the middle ear. Though felt to be deep-seated, it seems to lack definite location. Typical otalgias are rarely found in children, but are not infrequent with adults.

Otitis and Facial Paralysis.—Gellé, of Paris,⁸¹ has observed 31 cases of these combined affections, and believes that a certain connection exists between the two conditions. The otitis is characterized by pain, vertigo, and imperfect hearing; there is often incurable and total deafness. The inflammatory process is attended with acute œdema of the face and head. In acute cases, there is no tendency to suppuration. The otitis will often continue after the symptoms of paralysis have disappeared, and *vice versa*, but not with the intensity of the primary attack. The paralysis itself has no influence upon the disturbance of hearing. The abnormal acuteness of hearing observed occasionally is due to a persistent spasm of the tensor tympani muscle. Treatment consists in incising the drum-head, or making Wilde's incision, if the otitis is attended with pain, fever, vertigo, and deafness. Upon the intensity of these symptoms the author estimates the severity of a case more than upon the objective symptoms. The aural symptoms will disappear during the course of a month, while the paralysis may continue; but clinical observation shows that obstinate cases are apt to recur and run a chronic course.

Eustachian Synechiae.—William Robertson⁸² refers to the existence of such fibrous bands about the Eustachian orifices. They are most frequently found in subjects suffering from hypertrophied tonsils, and upon whom tonsillotomy has been performed imperfectly. These bands of adhesion are most successfully removed with the finger. This being introduced into the nasopharynx, is swept around the openings of the Eustachian tubes. The author believes that this procedure should always be performed after the removal of an enlarged tonsil.

Abnormal Patency of the Eustachian Tubes.—James Barrett²⁸⁵ reports the case of a patient suffering from autophony. The drum-heads were seen to move synchronously with the respiration. There was no disease of the naso-pharynx. Treatment was based upon the diagnosis of paresis of the muscles of the Eustachian tube, and consisted in faradization, one electrode being placed in the Eustachian orifice and one to the mastoid region. Permanent relief was the final result of this treatment. A. L. Kenney²⁸⁶ has recorded *a case of emphysema following rupture of the Eustachian tube*. The patient, J. H. B., aged 32 years, suffered from chronic otitis media; the turbinated bodies in the nose were also hypertrophic. This latter condition was treated by electro-cautery incisions. The Eustachian tube was dilated with bougies, and the middle ear inflated. This treatment had been continued for a certain period, when, one day, after the introduction of a bougie, the patient practiced Valsalva's method of inflation. He used considerable force in the attempt. A short time afterward swelling appeared at the ramus of the left jaw, increasing rapidly in size, and extending upward and downward. There was marked crepitation over an area extending some distance above the left ear, down along the front edge of the sterno-cleido-mastoid muscle, underneath the lower jaw and floor of the mouth, reaching as high as the right ear, and extending across the front of the neck to the right sterno-cleido-mastoid muscle, being there lost in the chest. Treatment consisted in the use of respiratory and cardiac stimulants, hot fomentations to the neck, and boro-glyceride as a gargle and nasal douche. The emphysema gradually disappeared in the course of three or four days. It is supposed that air found its way into the cellular tissue of the neck, etc., through a rent in the Eustachian tube, caused by a bougie and made larger—possibly entirely caused—by the patient's efforts in performing Valsalva inflation.

Audition Colorée.—Delstanche²⁸⁷ reports the case of a patient in whom certain musical notes produced the perception of colors, green being the color most clearly perceived. This color was invariably presented to the patient's mind on hearing the note "fa." The higher octaves of this note caused the color to appear more vividly than when the lower tones were sounded. The most brilliant effect in green was produced by the chord, fa, la, do, fa.

DISEASES OF THE ANTERIOR AND ACCESSORY NASAL CAVITIES.

By CHARLES E. SAJOUS, M.D.,

PHILADELPHIA.

PHYSIOLOGY.

To determine the route of the resired air through the nose, R. Kayser⁶⁶ repeated Paulsen's experiments (1882) with osmic acid on the heads of cadavers, having previously performed the powder experiment on them. He found that the powder deposit corresponded to the parts which were stained most deeply with osmic acid, except that the powder did not seem to extend so high as the osmic-acid stain,—a result which is very easily comprehended. The conclusion justified by these experiments is, that during inspiration in the normal nose the bulk of the air passes along the septum above the inferior turbinate body, describing a semicircle in its course and extending upward nearly to the roof of the nose. The division of the anterior nasal cavity into an olfactory area and a respiratory area is, therefore, not justifiable physiologically.

Our Paris corresponding editor, Gouguenheim, gives an abstract of a paper read by Potiquet at the Paris Laryngological Society³¹ on the canal of Jacobson, the possibility of recognizing it in the living subject, and its probable rôle in the pathogeny of certain affections of the nasal septum. This canal, a remnant of the foetal organ of the same name, and much developed in some mammalia, occupies the antero-inferior portion of the septum. Until now, Moldenhauer was the only rhinologist who attempted to find it in the living, but his efforts were in vain. In spite of many difficulties, some peculiar to the region and some to the canal itself, to the narrowness of its orifice and the shortness of its passage, Potiquet demonstrated that one can recognize it often enough with the eye, aided by a very fine probe, about six-sixtieths of a millimetre in thickness and perfectly blunt at its extremity. The

exploration of this canal, Potiquet adds, has, perhaps, not been considered as a necessary complement to the methodical examination of the nasal fossæ, but since it has been shown to be occasionally useful it should be the duty of the rhinologist to make use of it when necessary.

For many reasons, as well as from several observations, the author has been led to believe that this canal may well play an important part in the pathogenesis of certain lesions of the septum; in fact (a matter worthy of notice), the region of the septum,—that part the most important from a pathological stand-point, since morbid processes, whatever may be their nature (syphilitic, ulcerous, lupous, leprous, etc.), have for it a marked predilection, is precisely that part in which the canal of Jacobson is located. The author has seen small lupous and syphilitic lesions limited exactly to the space ordinarily occupied by the canal of Jacobson, and even 2 cases showing its form in a striking manner; but he has not been able to see these cases at the beginning,—that is to say, when the passage of the canal was still recognizable. This condition must be fulfilled before we can allow ourselves to make a new nosological classification, viz., Jacobsonitis. Potiquet summarizes as follows: (1) the canal of Jacobson may often, if not always, be recognized in the living; (2) the search for it must now be considered as holding an important place in the examination of the nasal cavities; (3) there is reason to seek for the relation between the canal of Jacobson and the lesions found in the region occupied by it.

HISTOLOGY.

E. A. H. Pilliet, of Paris, according to our corresponding editor, Gouguenheim, has examined the fibro-cartilage of the nose and ear in the adult,⁷ and finds that the elastic tissue forms a very clear net-work surrounding the cartilaginous cells, and that it is susceptible to modifications in adult age. These changes, tending to the destruction and disappearance of this tissue, are, he thinks, degenerative lesions, the elastic fibres being the first implicated. Those changes are not at all apparent during life, and, therefore, are not suspected.

Pilliet has also demonstrated before the Société Anatomique of Paris⁷ that the erectile tissue of the nose is most abundant at the crest of the turbinated bones, diminishing gradually as it

approaches the meatus and the external wall of the nasal fossa. The septum possesses none of this tissue. Erectile tissue is composed of irregular spaces, lined with an endothelial layer and surrounded by two layers of smooth muscular fibres, the inner longitudinal, the outer perpendicular to the preceding.

There are numerous layers of erectile vessels, diminishing in size in proportion to their depth, the deepest lying against the osseous tissue. Between them is found a certain amount of cellular tissue. Glands elsewhere very abundant may be absent from the erectile tissue, which during foetal life is absent or almost rudimentary.

BACTERIOLOGY.

Deletti ⁴⁶¹_{nos.} is reported by our corresponding editor, Massei, as having repeated the studies of Wright on nasal bacteria. Among the different kinds of micro-organisms observed, Deletti found two that were demonstrated to possess pathogenic power on rabbits. The first was a small, round micrococcus, frequently occurring in pairs, and which, in cultures, presented the appearance of a leaf, the gelatin remaining unchanged as to fluidity. Injected under the skin of rabbits, it produced, after thirty-six hours, an œdema, round at the seat of puncture, which disappeared after two days. The second was a short, thin bacillus, with rounded extremities, also frequently recurring in pairs (spores?). The injection in this case produced a more diffuse œdema two days after, which disappeared in three days.

ANTERIOR NASAL CAVITIES.

Acute Rhinitis.—The few papers published on this subject were but repetitions of well-known facts. Additional information on the use of euphrasia officinalis is given by Davis, of Omaha, Neb., ¹⁰⁶_{nos.} however, who adduces the observations of Culpepper, Hughes, and Garland. It is only useful at the outset of the attack, which it arrests with remarkable suddenness. It is especially valuable in the coryza of infants. A few drops of the tincture in a little water, given to a child at short intervals, will give prompt relief without disturbing the digestion. Having an aromatic odor and being pleasant to the taste, it is readily taken. W. B. Johnson, of Paterson, N. J., ⁵⁹_{nos.} recommends 10 minims (0.66 gramme) of the fluid extract of gelsemium at bed-time.

Membranous Rhinitis.—J. E. Newcomb, of New York,¹ _{sup. 12}

reports 2 interesting cases. Microscopical examination of a portion of the membrane showed only the ordinary fibrinous structure entangling a few epithelial and pus-cells, with here and there scanty rod-shaped and spherical bacteria. Wagnier, of Lille, ¹³⁶ described a case in which perforation of the septum and palate occurred. The caseous material ejected was composed of a magma of granular *débris*, with a multitude of bacteria and a large number of needle-shaped bacteria crystals.

Our corresponding editor, Massci, of Naples, reports a case seen by Strazza. ⁶²⁴ The latter is of the opinion that this is not an autochthonous affection, but the result of obstruction by foreign bodies, deviations of the septum, etc., with the addition of local sepsis. From the history of cases carefully examined, I am inclined to consider the position of this author as untenable. F. H. Potter, ¹⁷⁰ in describing a case, dilates upon the symmetry of the nose of the patient, and affirms the fact that there were no obstructions, either anteriorly or posteriorly. He reports a complication consisting of œdema, first of the upper lip, then of the lower lip and upper part of the throat, and finally of the tongue. The latter swelled enormously, and for a time a serious result was feared. Boland ¹¹ reports an adhesion between the septum and the inferior turbinate.

Hypertrophic Rhinitis.—Raulin, of Marseilles, ¹³⁶, completely restored the voice of an operatic singer by reducing bilateral hypertrophies of the posterior portion of the septum. The patient had been obliged to cease singing altogether, owing to hoarseness and complete loss of tone in the upper register. The author ascribes these symptoms to muscular fatigue of the larynx, due to efforts to compensate by excessive vibration of the bands the loss of resonance resulting from the presence of the hypertrophies, rather than to catarrhal changes. Uspensky ⁵³⁰ also refers to two professional singers who consulted him on account of impaired resonance, difficulty in emitting and tremor of high tones, complicated with dyspœa and weakness during vocalization. In both cases the larynx was found normal, while the nasal cavities presented hypertrophy of the middle turbinated bodies. Applications of galvano-cautery having corrected the nasal disorder, the voice returned to the normal state in both cases.

Prince, of Jacksonville, Ill., ²⁰², substitutes curved scissors for

the snare in the removal of hypertrophic tissue. The instrument employed is a modification of Weir's scissors, suitably curved and lengthened and reduced sufficiently in thickness to easily enter the inferior meatus. The construction of the blades, moreover, permits the biting edges to come in exact contact. He uses the instrument with one hand, and introduces a finger of the opposite hand behind the palate to meet the tips of the blades and place them in position. The patient's mouth is kept open by means of an O'Dwyer gag, and the operation is performed under anaesthesia. The author states that in but 1 case out of 50 was he obliged to introduce a plug to arrest haemorrhage, which, although seemingly profuse immediately after the evulsion of the tissues, usually stops after a few minutes.

Osseous Cysts.—Under the caption of "Cystopneumatic Degeneration of the Middle Turbinate Bone," H. Zwillinger, of Budapest,⁵¹² describes a rare and as yet but very slightly studied cause of nasal obstruction. The middle turbinate bone is converted into an air-containing, osseous bulla, hemispherical in shape, which the author appears to be anxious to not have confounded with a mucocele of the ethmoid or an osteoma. Reflex neuroses of various kinds, respiratory obstruction, partial anosmia, and a nasal twang are looked upon as indications for surgical intervention, which may either consist of snaring with the galvano-cautery loop or the use of ignipuncture followed by ablation with a pair of strong scissors. The diagnosis may be greatly facilitated by translumination and puncture to ascertain the character of the contents.

Charles L. Knight, of New York,⁹₁₀ considers these growths rather more frequent than generally thought. Of the two theories proposed to account for the development of the cysts—(1) rarefying osteitis and (2) hypertrophic rhinitis—he believed the latter the more probable. An ossific projection growing from the middle turbinate bone gradually curls upon itself until, finally meeting the body of the bone, it forms a closed cavity. Such cavity, being lined with ciliated epithelium, contains mucous secretion, and, if inflamed, muco-pus. Operative treatment is simple: the cyst cannot be removed entire, but is extirpated, and antiseptic dressings are applied. These cysts occur only in connection with the middle turbinate bone, and none of the cases were under 20 years of age.

Greville Macdonald, of London, gives a detailed account of the origin, pathology, diagnosis, and treatment of this variety of cyst, basing his study upon 6 cases seen by himself. The case reported by McBride in 1888, mentioned as being the first to appear in the literature of the subject, presented bilateral cysts, described as containing air. Macdonald believes that in all probability the process begins in an osteophytic periostitis, resulting in a general increase of the bone in every diameter. The free margin of the bone being incurved upon itself, pathological projection of this margin causes it to come in contact with the body of the bone, thus forming a cavity, which ultimately becomes hermetically sealed at all points by a similar pathological process. This cavity being naturally lined with mucous membrane, generates mucus, which, from lack of outlet, gradually distends the cavity into which it is secreted, and sometimes causes it to attain an enormous size and cause distortion of neighboring parts. Microscopical examination of any portion of the cyst-wall renders the correctness of this explanation most probable.

Concerning diagnosis and treatment, Macdonald speaks as follows: "Whenever an osseous tumor presents itself in the middle meatus of such a size that it is obviously something further than a simple osteophytic periostitis, whether presenting an osseous surface covered only by mucous membrane or whether it is concealed partially or entirely by polypoid growths, the probability is strongly in favor of cyst. When, moreover, these appearances are accompanied by a purulent and fetid discharge, one may safely surmise that he is dealing with a suppurating cyst or abscess of the middle turbinate. The diagnosis is finally substantiated by the removal of a portion of the walls of the tumor by snare or forceps.

"The treatment is simple enough in cases where the tumor has not attained enormous dimensions. The simplest way of effecting removal is to throw a strong snare around the mass and remove as large a portion as possible. The remaining portion of the walls may afterward be broken away with forceps. When the cyst is very large, and adhesions have formed to neighboring structures, the adhesions must be severed in the manner most easy of accomplishment,—that is to say, with the knife or electric cautery. In some cases, possibly, a saw might be necessary. Then, a sufficiently

large hole having been made, a pair of strong forceps is introduced and the walls torn away piecemeal."

Atrophic Rhinitis.—J. Wright⁵⁹ favors the view that atrophic rhinitis is the later stage of hypertrophy, as coinciding best with clinical experience and our knowledge of pathological changes elsewhere. In a few cases he has been able to observe this change from hypertrophy to atrophy. The two conditions may co-exist in the same nostril, and occasionally advanced atrophy may be observed in one nostril and marked hypertrophy in the other. He does not believe that the cause of the disease will be shown to be a special form of micro-organism, although he thinks it probable that the presence of micro-organisms give rise to the characteristic odor. As to treatment, Wright recommends thymol, which he has used for four years with success. He employs a watery solution of a strength of $\frac{1}{2}$ grain to $1\frac{1}{2}$ grains (0.032 to 0.097 grammes) to the ounce (30 grammes), which he applies in the form of a fine spray every other day, after careful cleansing with a weak alkaline solution. Cleansing should also be regularly practiced at home by the patient, who may then apply a solution of thymol in alboline by means of a few puffs from an alboline vaporizer.

Christovitch, of Salonique, Turkey,⁶⁰ believes in a microbian pathogenesis implicating mainly the glandular elements, and advocates thorough curetting, by means of a slender instrument, of the entire nasal mucous membrane, even that of the naso-pharynx. Any infarctuosity that cannot be reached by the curette must be thoroughly cauterized with the galvano-cautery. The marked hæmorrhage which ensues must be arrested by absorbent-cotton tamponing. But little inconvenience follows the operation, slight pain in the ears being the most prominent symptom. As preliminary measures, the cavities must be carefully cleansed with an alkaline wash, and the membrane rendered anæsthetic by an application of a strong solution of cocaine immediately before the operation.

Arnold, of San Francisco,¹⁴⁷ obtained excellent results in 31 out of 47 cases by the following treatment: during the first week the crusts are carefully detached daily, and the parts thoroughly cleansed by means of an alkaline solution such as Dobell's. The membrane is then lightly painted over with a mixture containing in each ounce (30 grammes) trichloracetic acid, 3 grains (0.20 grammes);

iodine, 5 grains (0.33 grammes); and glycerin, 4 drachms (16 grammes). Internally, $\frac{1}{6}$ grain (0.0012 grammes) of bichloride of mercury and 2 grains (0.15 grammes) of iodide of potassium are given three times a day in hot water after meals. Muriate of pilocarpine, $\frac{1}{2}$ grain (0.002 grammes), is also given twice a day in tablet form. The treatment lasted on an average ninety days.

Europhen does not, in Löwenstein's opinion,¹¹⁶ act so effectually as aristol when marked foetor exists; but in chronic atrophic rhinitis, attended with crust formation, without foetor, it is very useful. He treated 11 cases of this latter affection with insufflations of europhen, and found that after a few weeks the secretion became thinner, and the dryness and disagreeable sensations in the throat disappeared. Investigations as to the bactericidal properties of europhen have proven that it may be advantageously employed in all cases in which iodoform has been used.

W. C. Braislin, of Brooklyn,¹⁵⁷ claims no curative properties for aristol, but considers it as a valuable deodorizer and germicide, possessing furthermore the property of being somewhat stimulating, and tending to increase the active watery elements of the abnormally inspissated secretions. He insufflates it with a powder-blower, after thorough cleansing. Aristol is highly recommended by Bürkner, of Göttingen¹⁵⁸; Babcock, of Los Angeles, Cal.¹⁵⁹; and by W. C. Phillips, of New York.¹⁶⁰ The latter recommends a 30-grain (1.94 grammes) to the ounce (30 grammes) solution applied with the atomizer.

D. Phillips¹⁶¹ has obtained marked benefit from the local use of ichthylol in 27 cases. In all except one improvement was manifested after the second application, and crust formation stopped in from a week to ten days. After three or four weeks the odor usually disappeared. The ichthylol is applied in the form of a 5-percent. solution in keroline. The mode of application is as follows: The nose is sprayed with an alkaline solution, and thoroughly cleaned with a probe dressed with cotton. It is then dried, and the 5-per-cent. keroline-ichthylol solution is applied thoroughly by means of the cotton-wrapped probe. The patient is instructed to clean the nose with an alkaline spray night and morning, after which he sprays in a mixture of 1 part of keroline ichthylol to 5 parts of liquid alboline. A little eucalyptol or menthol may be added to this to disguise the fishy taste of the ichthylol. The use

of the spray is generally followed by some serous discharge, which lasts about half an hour.

Demme, of Berlin, ²² spoke highly of massage of the atrophied mucous membrane with a thin sound wrapped around with a little cotton, and carrying a 20-per-cent. pyotanin-lanolin ointment. By a gentle to-and-fro movement the entire diseased surface is stroked with the medicated cotton. He ascribes the affection to inherited wide nostrils and not to a special coccus. S. Solis-Cohen, of Philadelphia, ⁹ recommends bromoform as a topical application after thorough cleansing with hydrogen dioxide. Norval H. Pierce, of London, ⁶¹ reports a number of cases treated by Braun's "vibration" massage, and concludes that the speedy relief of the most disagreeable symptoms accompanying the disease—fætor, secretion, etc.—is mainly due to the cleanliness which plays so important a part in the treatment.

Syphilis.—Charles H. Knight, of New York, ⁹ in reporting a Rouge operation for the removal of a nasal sequestrum, very justly criticizes the employment of this operation for the cure of ozæna, and considers it particularly adapted for syphilitic necrosis when the sequestra are too large in size and irregular in shape to permit of withdrawal through the natural passages. He does not consider the operation as a formidable or hazardous one. Hæmorrhage may be copious, but it should readily be controlled by pressure; the process of repair is rapidly completed, and without deformity. Ohmann-Dumesnil, of St. Louis, ²⁷⁵ considers that the best means of making local mercurial applications to the nasal and pharyngeal cavities is to employ a spray-producer, which applies the remedy directly to the parts. In a patient who is careful, and who can bear mercury fairly well, he recommends:—

R Hydrargyri oleatis (5 per cent.), 3ij (4 grammes).
Albolineæ, 3ij (64 grammes).

M. Sig.: A small quantity to be used twice daily. Two or three compressions of the bulb are sufficient.

When an aqueous solution is desirable, he recommends the following formula:—

R Hydrargyri bichloridi, gr. j (0.065 gramme).
Ammoniæ muriatis, gr. vj (0.89 gramme).
Aq. destil., 3ij (60.00 grammes).

This is to be used in the same manner as the other formula.

Tuberculosis.—Beermann, of Riesenbeck,²¹⁵² describes a case of primary tuberculosis of the nasal mucous membrane occurring in an otherwise healthy woman aged 34. A small, round spot, covered with nodules, having been removed, recurrence followed four weeks later. The case was successfully treated with cauterizations. Tubercle bacilli were found in the portion removed. Another case of primary tuberculosis of the nose is reported by Capart, of Brussels.⁵² Thorough curetting was followed by permanent recovery. In another case pulmonary tuberculosis supervened, and death followed. A case of the same kind is reported by T. V. Fitzpatrick, of Cincinnati,⁵³ who takes advantage of the opportunity to review the pathological anatomy of the affection. Another interesting retrospect of the subject is given by Cartaz, of Paris.²¹² Plicque,³⁷ in a review of this subject, enumerates the different theories adduced,—those of Koch, Cornet, and Michelson. The paper is an interesting one for reference. A case of supposed nasal tuberculosis in a monkey is reported by F. L. Shurly, of Detroit.¹ The animal suffered from a catarrhal disorder of the nose, and the resulting discharges were found to contain tubercle bacilli, while the disorder was bettered by means of antiseptic solutions. The animal was killed, but no tuberculous lesions were found in the lungs or other viscera.

Lupus.—H. Krause, our corresponding editor in Berlin,⁶⁹ reported a case of lupus involving the nose, hard and soft palate, tongue, and gums, which he had treated with Koch's tuberculin. Scraping and scarifying had been employed in the case by others without permanent benefit, and when the case was seen by Krause the disease had made such inroads into the mucous membrane of the palate that the palate bone was bare. Although the first injection was only of 5 milligrammes ($\frac{1}{2}$ grain), the reaction was very severe, the temperature reaching 40° C. (104° F.). Five successive injections of the same strength were also followed by active reactions, but the sixth showed marked improvement in this respect, and the fever gradually ceased. Haemorrhage, swelling of the tongue and other lupoid structures; necrosis of the infected tissues, which became coated with a grayish layer, followed each other in rapid succession. The grayish layer was soon shed, however, and cicatrization followed. A further report on the case will be made later on.

E. E. Sattler, of Cincinnati,⁸³ described a case of lupus of the nasal mucous membrane in a boy of about 11 years. He had treated it by scraping, and then applying a 60-per-cent. solution of lactic acid with the aid of cocaine. There has been no extension of the case posteriorly. Lupus rarely affects the mucous membrane of the nose without involving its external parts.

Polypi.—Some interesting points were brought out during the discussion following the reading of a paper, entitled "The Present Position of Intra-Nasal Surgery," at the meeting of the British Medical Association, on Woakes's "necrosing ethmoiditis." Walsham, Hill, and Lennox Browne criticised the assertions made by Woakes as regards the frequency of this condition, which they considered on the contrary, and in accord with the great majority of rhinologists, as quite rare. Browne contended that neither on histological grounds nor by clinical facts had Woakes given satisfactory evidence of a truly necrotic degeneration, the stench of necrosis and the spontaneous extrusion of bony fragments, the chief clinical evidences of caries, being entirely wanting. The answer of Woakes that "necrosing ethmoiditis" did not imply that necrosis was present in every case, but only that there was inflammation of the ethmoid that would, if left alone, lead to necrosis, seemed rather to stimulate his opponents than to quiet them, and Browne terminates an account of the meeting¹¹ with the hope that the criticism which Woakes's views received may help to convert their author to a sense of their incorrectness.

Stepanow, of Moscow,⁸¹² May, calls attention to the hyaline globes often found in nasal polypi, adenoid vegetations, etc., and in rhinoscleromatous tissue, and expresses the belief that they are produced by the entrance of bacilli into the tissue. He also thinks that the formation of hyaline cells is a process of *vis medicatrix naturae*, which prevents too great propagation of bacilli.

B. Lewy,⁴ May, drew attention to cases in which he has found Charcot-Leyden crystals in polypi of the nose, the tumors being all of a benign nature. The crystals were not present in the polypus ready made, but appeared first in the preparation which is made by taking a morsel of the growth and crushing it between the slide and cover-glass. After a time the crystals show themselves. Little needles are to be seen forming between the cells and in the fluids of the crushed morsel; they grow rapidly, just as

crystals do from a mother solution, and meantime more needles in other places emerge and gradually enlarge to the well-known double pyramids.

Natier, of Paris, ¹² published an elaborate study of mucous polypi in children up to the age of 15 years. He compares the general opinion as to the extreme rarity of these growths during the first years of life with that of Hopmann, who considers them sufficiently frequent before the fifteenth year to represent a proportion of 7 per cent. Natier was not able to find a single instance in 1200 cases of nasal trouble carefully examined at his clinic, including a large number of children as patients, while, at his request, a close examination of the records of Moure's clinic by Grossard revealed only 5 cases of mucous polypi in children in 10,520 cases. He, therefore, concludes that Hopmann must have met with a series of cases as a coincidence, or that the climate of the region in which he lives is particularly favorable to the growth of these neoplasms. A case of congenital polypus was reported by LeRoy, of Paris. ¹⁵² The infant experienced much difficulty in taking the breast, and upon examination a small polypus was observed in the left nasal fossa.

Kurz, of Florence, ¹¹³ simplifies the operation of removing polypi by attaching to the spring of a Bellocq cannula a string with which are connected, at a certain distance apart, three sponges of increasing size. The first and second should be large enough to sweep the sides of the cavities, thus removing the growths. The third, larger still, may be left *in situ* as a tampon in case of haemorrhage.

A. Marmaduke Sheild, of London, ⁶, describes a case in which extensive malignant disease was found underlying a common myxomatous polyp, which presented the peculiarity of rapid recurrence and frequent bleeding. He advises great caution in the treatment of cases of myxoma presenting these characters, and recommends removal of the affected bone as early as possible.

W. E. Casselberry, of Chicago, ⁹, states that the best results follow extirpation of the base from which the myxomata grow. In two-thirds of the cases myxomata develop in connection with or beneath the middle turbinated bone. They rarely develop from flat surfaces, but generally from free borders or edges. From the effects of hypersecretion the mucous membrane becomes sodden,

and furnishes a good soil for the growth of myxomata. Such a soil is found upon the free edge of the middle turbinated bone, and hence the frequency of their occurrence in this situation. These growths may be removed with curved scissors or with punch-forceps, and if part of the bone is removed at the same time it is generally an advantage, although not too much should be taken away for fear of occasioning cerebral mischief. The site of the growth can be touched with the cautery.

Cysts.—C. W. Richardson, of Washington, D. C.,⁶¹ reviews in an interesting manner the subject of nasal cystomata. His article is somewhat marred, however, by the erroneous spelling of many well-known names—"McKenzie," "Brown," "Sturck," "Votolini"—typographical mistakes without a doubt. He adds 2 cases to those already reported. In the one, a man 32 years of age, the growth was situated in the right cavity, posteriorly, and burst while the loop was being adjusted around its base. In the second patient, also a man, aged 23, the growth met with the same mishap while being removed.

Fibroma.—J. V. Ricketts, of Cincinnati,⁵³ describes a case of fibroma of sufficient size to completely occlude one of the nostrils and extend posteriorly below the level of the palatal margin. The case is a fair example of what perseverance and skill will accomplish in extirpating these growths without the use of the knife to increase working space.

Carcinoma.—Madeuf, of Paris,³⁷ reports a case of *epithelioma* in a man aged 23. The growth looked like a polypus at the start, without, however, presenting the consistence or mobility of this class of neoplasm. A microscopical examination determined its true character. A. E. Barker² gave an account of a peculiar tumor of the nose, which presented all the characters of an ordinary polypus when seen *in situ*, with the exception of small haemorrhagic spots that studded its surface. The case was found to be one of carcinoma myxomatodes, and ended in death. The patient was a woman aged 40. A. Faidherbe, of Lille,²²⁰ extols the virtues of a saturated solution of chlorate of potassium applied with compresses, and followed, when cicatrizing commences, with applications of the salt in the form of fine powder.

Sarcoma.—Bowlby² mentioned 3 cases of sarcoma, 2 of which were at first thought to be instances of common polypi. In

the one, a boy aged 19, recurrence occurred in thirteen months, followed by death. In the second recurrence also took place, but a second operation ended in recovery. T. Payson Clark, of Boston,⁹⁹ reports a case in a colored man aged 35, and ably reviews the literature of the subject. The case is still under observation. A case is also reported by J. Reinhold, of Würzburg,⁵⁷ in a girl 16 years of age. The growth, termed by the author a myxosarcoma, had not recurred fifteen months after the last operation.

David Newman⁹⁸ records 3 cases of sarcoma (besides 2 of carcinoma) of the nasal fossæ, and makes his report the text for some general observations in the diagnosis and treatment of malignant growths. In the first case the tumor occupied the left middle and superior turbinated bodies of a man aged 64 years, and gave rise to profuse haemorrhage. There was considerable suffering and protrusion of the eyeball. Death by coma, sixteen months after the onset of the disease. In the second case, a man aged 46, it was situated in the middle turbinated body. The symptoms were at first those of a mucous polypus; but marked epistaxis and increasing obstruction supervened, followed by the development of cerebral symptoms. This case also died from coma sixteen months after the apparent onset of the disease. The third case was a middle-aged woman, who suffered from sarcoma of the septum. There was obstruction, haemorrhage, and deformity of face. There had been no recurrence of the tumor eight months after operation. All were round-cell sarcomata.

Newman emphasizes the fact that malignant and benign neoplasms may co-exist in the same individual, and recalls the cases reported by Voltolini, Hopmann, Schaeffer, Terrier, and Ricard. He deems it wrong to always conclude that because a benign growth has been removed from the nostrils, and proved to be such by the microscope, other growths occurring in the same individual should also be considered benign.

Papilloma.—J. Wright, of Brooklyn,⁹⁹ believes that Hopmann and others, who have considered this class of neoplasm a common one, based their writings upon erroneous diagnoses. He, on the contrary, considered it as very rare, and occurring generally on the septum at the muco-cutaneous junction. He proposes the term "papillomatous fibroma" as a better name for this variety of growth, which should not be mistaken for the glandular

hyperplasia occurring in the course of chronic rhinitis, and appearing especially upon the inferior turbinated bone. Noquet, of Lille,¹³⁶ in reporting an interesting case in a man aged 49, in which the tumor was situated at the lower part of the left nasal cavity, posteriorly, also dilated upon the rarity of true papilloma of the nose. He believes that Hopmann, Schech, and Schaeffer, who described them as of frequent occurrence, had included under the designation of papilloma all growths having a papillary appearance, such as angiomata, adenomata, and papillary sarcomata.

Rhinoscleroma.—Besnier⁸⁸⁵ June, July reports a case of this affection occurring in a woman born in South America. It had begun at the septum four years previously, gradually spreading to the entire nasal cavities and the pharynx. The bacteriological examination was conducted by Jacquet, the specimen examined being taken from the centre of the growth. Two microbes were found,—the streptococcus pyogenes and the short bacillus described by Frisch, Cornil and Babes, and Pellizzari, which resembles that of Friedländer, and differing only from it, according to Paltauf and Eiselberg, in that it is less virulent. Jacquet considers all the microbes as secondary. Netter, who examined the preparation, could establish no difference between the bacillus seen and that of Friedländer. Besnier believes that medical treatment is useless. Rhinoscleroma is extremely rare in France. (Report of Gouguenheim, corresponding editor.)

Mibelli⁵⁰⁷ N.S. recommends a new method of staining the bacilli of rhinoscleroma. He employs the alum-carmine prepared by Grübler according to Grenacher's method, a 4-per-cent. solution in hot water. The sections are placed in this stain for about an hour, sufficiently long to obtain a good staining of the nuclei. They are then washed in water and treated in the ordinary manner with alcohol, preparatory to mounting in dammar-varnish. They may remain twelve to twenty-four hours in the staining material without injury, and they may also be treated with an alcoholic solution of sulphuric acid. In each instance when the nuclei were well stained, he found the bacilli beautifully colored and all the changes in the tissue well brought out. The author recommends the thinnest sections for examination, and affirms that the ordinary unchanged infiltration-cells in this affection do not contain bacilli. (Report of Szadek, corresponding editor in Kiev, Russia.)

Pavloff, of St. Petersburg, ⁵³⁰_{May, 1861; Nov. 1861} ⁵⁸⁶ relates a case of six years' standing in a woman. The nodule, upon being incised by a surgeon, began to spread rapidly in every direction. He emphasizes the creeping tendency of new growths. Pavlovsky ⁵³⁰_{Nov.} described 2 cases of a peculiar variety of the affection, 1 of which referred to a middle-aged male peasant, who sought his advice on account of blood-stained nasal discharge of three years' standing. Except for some elevated scurf, the nasal integuments were sound, but the right nostril was found to be filled up with villous vegetations and a polypoid tumor, which was as hard as a chondroma, and, on the whole, resembled a sarcomatous polypus. The new growth was removed (by excision and scraping out after a preliminary splitting up of the nasal wing), and, under the microscope, proved to possess a typical structure of rhinoscleroma, with characteristic encapsulated microbes and hyaline masses. The other patient, a man of 35, similarly presented rhinoscleroma of the polypoid form, the symptoms being of one and a half years' duration. The author thinks his cases justify him in supplementing the chapter on nasal polypi by a new variety,—“rhinoscleromatous polypi.”

E. Joannou ¹⁰²⁵_{Dec.} records a case of rhinoscleroma of a hitherto undescribed form. The affection occurred in the form, clinically, of a complication of syphilitic infection in both nostrils, the history apparently verifying this. Extensive excoriations of the cavities, soft palate, uvula, and a large growth of the inferior maxillary, with hardness of the cheek on that side and paralysis of the masseter, impaired vision due to pressure on the optic nerve, with exophthalmos and paralysis of ocular muscles, were all shown by Kundrat to be complications of a rhinoscleroma in the diagnosis being established by the microscope.

Foreign Bodies.—Berlioz, of Paris, ²⁸⁶_{May, June} presents an able résumé of the subject, and gives the chemical analysis of 4 rhinoliths obtained in his practice. In 100 parts he found:—

	Case 1.	Case 2.	Case 3.	Case 4.
Water	5.80	5.10	4.00	6.90
Organic matter	16.60	18.20	16.00	18.10
Phosphate of lime	62.02	60.61	61.40	47.63
Phosphate of magnesia	5.08	6.28	3.93	9.68
Carbonate of lime	10.59	9.81	14.67	20.69
Traces of iron	Doubtful.	Distinct.	Doubtful.	Distinct.

This table is of interest, inasmuch as it varies considerably with the analyses usually given. He considers their composition as usually the same and resembling that of bone. The salines find their origin in the nasal mucus, which is secreted increasingly in these cases, and which undergoes modifications as yet insufficiently studied. Berlioz considers it more rational to consider but one class of rhinoliths,—that of secondary formation.

We are spared this year the endless and numberless contributions which usually appear on this subject, the list of objects presenting dimensions making it possible for them to become intruders in the nasal cavities having probably become exhausted. Cherry-stones are about the most common of these; but a bilateral intrusion, the stones having been buried sufficiently long in the cavities to form rhinoliths, was considered as worthy of special notice by Nitsche, of Salzbrunn.³¹² Kelliher, of Pawtucket, R. I.,³² made a five-inch hair-pin the subject of a paper, but his case is interesting owing to the fact that the pin had disappeared from view, and was finally found in the posterior nasal space. J. A. Thompson, of Cincinnati,⁵³ who had previously reported the fact that he had extracted a tooth from the middle meatus, now states that another tooth is to be observed growing in the same region. John Dunn⁸¹ mentions the case of a negro in whose nostril the breech-pin of a gun—a screw-shaped piece of metal, two and three-eighths of an inch long and one and three-fourths of an inch in circumference, and weighing 495 grains (32 grammes)—was found imbedded, the result of an explosion while the piece was being fired off.

Kurz, of Florence¹¹³ suggests the use of sponges, as described under the heading of nasal polypi, for the removal of foreign bodies.

Maggots in the Nose.—Several cases of this affection were reported during the year. R. W. Seary, of Burnette, La.,⁷⁶⁰ describes a case occurring in an aged negress, in whom an incision through the skin of the nose was found necessary to reach the larvæ. W. H. Grayson¹⁰⁹ alludes to the possibility of mistaking the affection with idiopathic erysipelas, and greatly recommends campho-phénique, with which he flushed the cavities by means of a nasal syringe, and obtained rapid recovery. The tenacity of life of the larvæ in media usually fatal to all other forms is emphasized, immersion in pure chloroform even not being followed by immediate death. He rightly criticises Küchenmeister, who recom-

mends their extraction with forceps. Delobel, of Noyon, France, ²¹²_{Aug. 25} and Jacobsen, of Havana, Cuba, ³⁷_{Mar.} each report a case. The former seemed to have obtained satisfactory results with alkaline washes, while the latter employed benzin injections, followed by carbonized washes. Brokaw, of St. Louis, ⁸²_{Sept. 23} described a case simulating erysipelas; and Allingham, of Bishop, Cal., ¹⁴⁷_{Mar.} one simulating meningitis. The former subjected his assistant to the trying ordeal of picking the larvæ out with forceps, while the latter found in the use of Marchand's peroxide of hydrogen and injections of kerosene more rapidly effective and less trying remedies on both physician and patient.

Epistaxis.—H. A. Rawlins, of London, ²_{Mar. 15}, considers the following method to arrest epistaxis easy and effectual: Cut a ribbon of lint, seven inches in length and one in width. Place this on a table, with one end at the edge of it. Take a director and place it on one-half of its length, with a probe placed in its groove; now fold the other free half of the lint over both probe and director. Grasp the whole firmly and pass them through the nostril downward and backward as far as they will go. Liberate the probe from the director and press its point backward, so as to prevent the lint following the director during its extraction. By a rotatory motion the probe itself can then be easily withdrawn. The lint may remain twelve or eighteen hours before it is removed.

A. A. Philip, of Belfast, ²_{July 18}, advocates the following procedure: A piece of old, soft, thin cotton, oiled silk, or silk, about six inches square (a piece of an old handkerchief will answer), is taken, and, by means of a probe, metal thermometer-case, or pen-holder, is pushed, "umbrella" fashion, into the nostril, the direction of pressure, when the patient is sitting erect, being backward and slightly downward. It is pushed on until it is felt that the point of the "umbrella" is well into the cavity of the naso-pharynx.

A considerable quantity of cotton-wool is pushed well back to the bottom of the sac in the pharynx. Then, the thermometer-case being held well against the packed wool, the mouth of the sac is pulled upon, and thus its bottom is drawn forward and forms a firm, hard plug, wedged into the posterior nares. The sac may now be packed full of cotton-wool, dry or soaked in some astringent solution. The mouth of the sac is tied just outside the nostril, trimmed with scissors, and the ends of the thread secured outside.

It might be suggested to oil the cotton or silk, but Philip has never found any difficulty without the oil, as the blood renders the material wet and easy of introduction, while the oil does not facilitate removal, and may modify the effect of any haemostatic employed.

In removing the plug, open the mouth of the sac, and, with small dressing-forceps, gently remove the cotton-wool bit by bit. If there is bleeding, simply syringe the sac with weak carbolic lotion or Condy's fluid, and repack with clean cotton-wool. If there is no bleeding when the wool is picked out gently pull out the sac, or if it be adhering to the mucous membrane of the nostril apply a little warm water, and it may then easily be removed.

Another simple method of controlling epistaxis is that of W. W. Parker, of Richmond, Va.²⁶ "I use fifteen of the long threads of patent lint, three and one-half or four inches long, which I double on themselves and tie in the middle, and let one end of the string be six or eight inches long, so as to pull the plug out when necessary. When doubled on itself it looks like a 'comet' in miniature, with a nucleus and thirty tails, or twice the number of threads used. A probe is pressed up against the centre, and is passed back upon the floor of the nasal cavity and pushed on till you reach the posterior nares. This will be known both by the resistance and the length of the probe or the depth which you have reached. Then slowly withdraw the probe and plug the anterior nares, and you have arrested the bleeding. These twenty or thirty ends floating in the blood at once coagulate it. The passage of the soft lint gives no pain whatever. If lint is not at hand I use the largest size spool-cotton. The plug is removed in from twenty-four to forty-eight hours. It gives no pain, and the patient is willing for it to remain."

In epistaxis associated with hepatic disorders resulting from malarial poisoning, J. C. Minor, of Hot Springs, Ark.,⁵⁰⁶ recommends an ointment of the yellow oxide of mercury, vigorously applied over the region of the liver and spleen, night and morning, for several days.

W. H. Daly, of Pittsburgh,² recommends a method which he considers as possessing no advantage over Rawlins's, excepting that he uses cotton-wool instead of lint. Take an elongated quantity of cotton-wool, lengthwise of the fibres, which, when

doubled upon itself, will be somewhat conoidal, and completely fill the naris it is intended for, especially the posterior end; but, before doubling it upon itself, fortify the cotton by spiral turns of soft thread, such as is used by grocers, then, doubling the mass upon itself, you have a cone of cotton, three or four inches long or more, from the smaller end of which extend the strings, which ought to be tied together, the knot to include some of the fibres of the cotton at the ends. Now, if thought necessary, this mass can be saturated with a solution of alum, but preferably it may be anointed with a little lard or vaselin. Now, with a thin probe or knitting-needle in the right hand, the mass of cotton is to be caught in its fold at its larger and what ought to be the distal end of the cone, while the strings are caught in the fingers of the same hand, and you have now the cone of cotton-wool extended upon your probe or knitting-needle and secured in your right hand, while with the left hand the point of the nose can be elevated, and, with a rather quick thrust, the conoidal mass of cotton is carried back until the yielding sensation is imparted to the hand, which indicates that the distal end of the cone has emerged through the opening of the posterior naris into the pharynx. The slender probe or knitting-needle or grooved director, as you please, is now easily withdrawn by giving it a sudden retractive start, and the knotted ends of the strings are then cut off and tucked into the naris out of sight, to be easily hooked out and grasped for the removal of the cotton plug which it secures in its spiral folds.

Saverny²⁰⁵⁴ reviews the literature of epistaxis in Bright's disease, and lays great stress upon the importance of an absolute milk diet, as recommended by Potain, of Paris. The usual local means are recommended for the arrest of the haemorrhage.

Pogorelsky, of St. Petersburg,⁵⁵¹ recommends the method proposed by Heryng, of Warsaw,—cauterization of the bleeding spots with crystalline chromic acid. He successfully treated 3 school-boys, in whom every other measure had failed.

T. Hubbard, of Toledo,⁸¹¹ Sept. makes a general onslaught on chemical styptics, in powder or solution, and protests against "blindly packing the nasal chambers fore and aft with plugs of lint, etc.,," characterizing the lint tampon as "a sort of barbaric relic." He locates the bleeding vessel by means of cocaine, "destroys it with chromic acid, insufflates antipyrin and "a healing

power" (powder ?), and gives either acetanilid, ergot, or morphia internally. The author's protests are not warranted. T. V. Fitzpatrick, of Cincinnati, ⁵³ _{Nov. 7} advises that a powder of a light color be used to discover the bleeding spot, the blood forcing its way through it to the surface, and being then clearly seen. He found aristol to be valuable not only for this purpose, but as a styptic.

SEPTUM.

Deviation.—Several reviews of this subject have appeared during the year, most important among which may be mentioned those of Sedziak, of Warsaw ¹¹ _{Mar.}; Potiquet, of Paris ¹⁸⁶ _{Apr. 15}; and Price Brown, of Toronto ³⁹ _{Sept. 1}; but, on the whole, nothing particularly new has been presented.

To the stellate incision, made with Steele's forceps, Todd, of St. Louis, ⁹ _{June 20} adds a subsequent operation by cutting across the base of the most refractory segments with a curved knife, this second cutting being made while a finger is held in the opposite nostril to prevent wounding the membrane on that side, the knife being made to cut only the cartilage after incising the membrane of the other side. The second operation is performed a few days after the first, after anæsthetizing the parts with cocaine, Todd succeeding by this means in overcoming the tendency to the recurrence of deviation usually following attempts to straighten the septum.

Abscess.—C. Dunbar Roy, of Atlanta, ²⁰⁷ _{Oct.} reports a case of fracture of the cartilaginous portion of the septum followed by acute perichondritis, a slight thickening of the entire cartilage, and a low ridge over the seat of fracture being about the only untoward results. Luc ²⁸⁶ _{Apr.} reports a case of traumatic abscess, its evacuation being followed by complete resolution with deformity.

Schaeffer, of Bremen, ⁶⁹ _{July 20} treats abscesses of the septum by making an elliptical incision into the redundant membrane, removing the contents thoroughly with a spoon, and antiseptic after-treatment. Five cases treated in this manner gave very satisfactory results.

ACCESSORY CAVITIES.

Schaeffer, ⁶⁹ _{Nov. 10} basing his opinion on 17 cases of disease of the frontal sinus, 19 cases of disease of the ethmoidal sinus, and 7 cases of disease of the sphenoidal sinus, considers the site of the

deposit of pus as very important from a diagnostic point of view. When the frontal sinus is implicated, the pus covers the septum nasi as far as the level of the middle turbinated bone, and frequently the mucous membrane is found swollen beneath the layer of pus. When the ethmoidal sinus is diseased, the pus spreads out between the inferior and the middle turbinated bones. When the sphenoidal sinus is affected, posterior rhinoscopy shows the pus trickling along the arch of the pharynx.

Frontal Sinus.—Vincentüs and Polignani, of Naples,²¹⁵⁶ alluding to mucocele of the frontal and ethmoidal sinuses and the consequent exophthalmos, consider as a cause an inflammation of the walls of the sinus, which, by obliterating the orifice, induces an accumulation of local products. Vincentüs prefers to open the tumor through the nose, as done by Riberi. (Report of Massei, corresponding editor, Naples.) Pavloff⁵⁸⁶ _{No. 10} reports a fatal result in a case of abscess of the frontal sinus and cribriform bone, and believes that the pus spread through the optic foramen or the holes in the cribriform plate to the base of the brain, where it produced meningitis, or, perhaps, even formed an abscess in the frontal central sulcus. In cases of chronic nasal diseases, complicated with affections of the frontal sinus, the author advises against attempts at cleansing the sinuses through their natural openings, as this may injure the cells of the cribriform bone, and may serve as a means of inducing septic matter into the sinus (in this case in the matter removed from the sinus *streptococcus aureus* was found), but to make a large opening with a trephine.

J. W. Hulke, of London,⁶ _{No. 14} gives a short review of the diseases of the frontal sinuses and reports 4 very interesting cases,—1 of double mucocele, two sinuses having formed a complete septum, and 3 of polypi. In 1 of the latter the growths caused phlegmonous cellulitis and sloughing of the skin, followed by forcible extrusion of the growths; in another, recurrence of the growths took place, perforating the orbital plate and destroying the eyeball. Enucleation of the latter, thorough removal of the neoplasms and scraping of the lining membrane of the diseased cavity, was followed by cure. The author calls attention to the gravity of the occurrence of mucous polypi in this situation, and to the fact that their obstinate tendency to recrudescence is similar to that in the cases of nasal polypi. Owing to

their more strict confinement in the narrow sinuses, their expansion more quickly expands and wastes the bony walls.

Our corresponding editor in Copenhagen, Holger Mygind, reports a paper by John Berg, of Stockholm,⁸⁷¹ in which this author relates a case where he extirpated thirteen osteomatous growths from the frontal sinus with success. The patient, a man aged 37, had occasionally had abundant discharge of a clear fluid from the nose, which always had relieved the headache he frequently suffered from. In a case of a lady aged 25 who, during ten years, had suffered from progressive loss of sight (owing to atrophy of the optic nerves) and violent headaches, and where there was some protrusion of the eyes, and lately, also, loss of the sense of smell, the author suspected a hydrops of the sphenoid sinus, removed the right eyeball (there only being perception of light on both eyes), and trephined this cavity through the internal wall of the orbit. A yellowish fluid appeared, showing pulsation, and the patient felt greatly relieved during the following months, while an abundant fluid was discharged through the drainage-tube. The pains returning, the author dilated the wound, explored the cavity with a finger, but did not find any growth as expected. Since then the patient has been well (except for the blindness). The author next gives a synopsis of the literature on abundant watery discharges from the nose, and discusses thoroughly the different theories, adhering to the opinion that it is caused by exudation from or rupture of enlarged lymphatic communications between the subarachnoid space and the mucous membrane of the nose.

C. H. Mayo, of Rochester, Minn.,¹⁰⁵ gives a history of a case recently operated upon by him, and advises, should drainage fail to effect a cure, permanent drainage by trephining the frontal bone at the root of the nose and re-opening the infundibulum from above down.

L. Montaz, of Grenoble,²⁸⁶ gives a complete history of the subject. He calls the attention of operators to the extreme thinness of the posterior wall of the frontal sinus, and to the fact that it is only fully developed at puberty. This suggests great prudence in operating on young subjects.

Cholewa, of Berlin,¹¹⁶ obtained rapid resolution in a case of suppuration by applying pyoktanin after carefully syringing the cavity.

Ethmoidal Sinus.—F. H. Bosworth ⁶⁷³ ₁₈₉₁ read a paper before the American Laryngological Association on various forms of ethmoid disease, based on an analysis of 27 cases which had been under treatment during the past five years. He classified them as follows, reporting, somewhat fully, illustrative cases of each form: (1) extra-cellular myxomatous degeneration without purulent discharge; (2) extra-cellular myxomatous degeneration with purulent discharge; (3) purulent ethmoiditis with nasal polypi; (4) intra-cellular myxomatous degeneration without pus, and (5) intra-cellular myxomatous degeneration with pus.

The second variety he regards as practically a later stage of the first, while the fifth variety is a later stage of the fourth, thus reducing it to three varieties. For the first and second, as well as the fourth and fifth varieties, he assigns no definite cause. The third variety he regards as the direct result of the nasal polypi, and not as a cause, as Woakes argues. This view is substantiated by the fact that, in a majority of his cases, the ethmoid disease was accompanied with purulent disease of the antrum.

The diagnosis is based on close ocular inspection and a nice tracing of the source of pus-discharge. The diffuse myxomatous degeneration so frequently seen covering the middle turbinated bone he thinks should be accepted, in the majority if not in all cases, as evidence of a diseased condition of the mucous membrane lining the ethmoid cells.

The treatment of all forms consisted of uncovering the ethmoid cells, by removing the convex cap of the middle turbinated body by means of the snare, and subsequently breaking up and destroying, as far as possible, the trabeculæ by means of the electric burr or the curette.

Sphenoidal Sinus.—In a case previously treated by him for empyema of the antrum, Ruault, of Paris, ¹⁹⁶ ₁₈₉₁ found the superior meatus full of pus, the patient complaining of fetid discharge in the throat, cephalalgia, and tinnitus. On the sphenoidal sinus being trephined by means of a special trocar pus flowed out at once, and the patient soon recovered. The trouble is ascribed by the author to an inflammation following the forcible removal of a nasal polypus some time before.

Antrum.—Ziem, of Dantzig, ⁴ ₁₈₉₁ repeats his opinion that the diagnosis of suppuration of the maxillary sinus cannot be made

with certainty by illumination through the mouth. This is especially the case where neither the amount of pus nor the thickening of the mucous membrane is sufficient to interfere with the transmission of light and with the size and thickness of the walls of the cavity.

Luc, of Paris,²⁸⁸ describes a case of empyema of the antrum in an aged woman who had suffered from erysipelas of the face nine months previously. An opening being made through the nasal fossa, the pus obtained was shown to contain erysipelas streptococci in chains.

J. M. Jeanty, of Bordeaux,²¹⁵³ wrote an exhaustive monograph on latent empyema of the antrum, a form in which the pathognomonic symptoms of the affection are absent, its presence being only ascertained by means of an exploratory puncture. As indications for this operation, he mentions nasal blennorrhœa and a symptom frequently met with and of importance as a diagnostic sign,—cacosmia,—that form experienced by the patient only. Jeanty believes that many pyæmic affections find their origin in unrecognized pyæmia of the antrum; and, to bear out this statement, he mentions a case in which a purulent pneumonia followed by pulmonary abscess was clearly traced to antral disease. The nasal or gingival punctures are considered of service for the purpose, but the author prefers perforation of the nasal wall at the inferior meatus, a thin, straight trocar being employed. Such an exploratory incision, were it even to prove negative, would save the patient the larger opening often practiced or the unnecessary extraction of a tooth. Twenty-two cases studied at Lichtwitz's clinic form the basis of this work, which is a very creditable one in every way.

Moure¹¹,_{July} calls attention to the fact that some affections of nasal cavities give rise to symptoms resembling those of empyema of the antrum, and mentions 2 cases in which there was a fetid suppuration, abundant and unilateral. By rhinoscopic examination anteriorly one could see, at the extremity of the middle turbinated bone, an inflammation of the membrane near the opening of the antrum. Destruction of the hypertrophied tissue with the cautery cured the patient. It was in reality a suppurating pouch, and the sinus itself was healthy.

Bloch, of Heidelberg,³⁴,_{Aug.} recommends the trocar modified by

Jurasz to perforate the naso-antral wall, and through the hole thus formed irrigates the cavity by means of a double-current catheter, employing a solution of creolin. He mentions 3 cases in which this method was applied with satisfactory results.

Luc, of Paris,²⁸⁶ recommends an easy method for the introduction of cleansing liquids into the maxillary sinus when a dental opening exists. The patient is advised to carefully cleanse his mouth by means of "borated water," after which a mouthful of the solution is forced into the antrum by compressing the cheeks as in the act of blowing. The fluid finds its way into the cavity, and comes out by the nasal orifice. The dental opening should be maintained patent by the insertion of a plug. Luc uses the olive-shaped tip of a urethral cannula, as recommended by Guyon.

NEUROSES.

Reflex Neuroses.—Kürt⁴¹, suggests a method for controlling spastic conditions due to motor neuroses. Recognizing the fact that the application of certain irritants to the peripheral endings of the trigeminus, particularly at the conjunctiva and the nasal mucous membrane, retards reflex motor action, he takes advantage of this therapeutic principle to utilize such drugs or medicaments as antipyrin, quinine, and sugar. These he dusts with a camel-hair pencil, either in the eye or nasal mucous membrane, and asserts that he can thereby control the spasm of whooping-cough, laryngospasm, facial contractions, and some forms of epileptic attacks.

Peltesohn^{42,10} reports the case of a man aged 20, in whom a *tic convulsif* of six years' standing was completely cured by the removal of a raspberry-like hypertrophy of the inferior turbinate bone. Jacobi, of New York,²¹⁵⁴ has often observed convulsive movements of the facial muscles in children, all of whom had inflammation of the nasal, naso-pharyngeal, and pharyngeal mucous membrane. Winckler, of Bremen,^{43,11} in 100 stutterers between 11 and 12 years of age, found 69 in whom some disorder of the nasal cavities existed. Botez, of Barcelona,²⁶ obtained cures in a case of supposed laryngeal obstruction and in 1 of asthma by thorough treatment of the nasal cavities. The same result was obtained in a case of chorea—who was subject to vascular tumefaction of the inferior turbinate bodies—by William Davis, of Omaha, Neb.²⁷⁹

Aprosexia.—Guye, of Amsterdam, ¹⁵ describes 2 recent cases in which the mental status was brought from a low to a normal standard by adequate treatment of the air-passages. In conclusion, he indorses the views of Raulin, of Marseilles, ¹⁸⁶ _{Nov. 15, '90} which are the following: 1. No child should be taken in a school without a medical certificate showing it to be bodily fit for the mental exertion of intellectual training. 2. There ought to be medical school-inspectors, to whose task, among others, should belong the careful inspection of the upper air-passages of school-children. 3. Teachers ought to assign to the medical inspectors all children who remain behind in intellectual development and who breathe through the mouth. Guye adds one conclusion to these: 4. As long as medical school-inspectors are wanting, teachers should be impressed with the importance of giving attention to the question of mouth-breathing, especially in children who remain behind in intellectual development, and with their duty of warning the parents or guardians of such children to seek competent medical advice.

Anosmia.—Gottschalk, of Berlin, ⁹⁰ _{Nov. 22} reports the complete loss of the sense of smell in a woman, aged 36 years, whose ovaries had been removed on account of a uterine myoma. One year later, when the artificial climacterium had been completed, a careful examination verified the assertion of the patient that complete anosmia existed, this condition being accompanied by spinal irritation and other climacteric symptoms. Gottschalk considers the loss of smell as one of these symptoms.

Hay Fever.—Isidor Gluck, of Omaha, ⁵⁰ _{May 16} inclines to the belief that the neurotic element of hay fever is a product of the disease, which he considers as pre-eminently a local one. From 13 cases treated, he concludes that an attack can be aborted in from two to five days. A 10-per-cent. solution of sulphate of atropia is applied locally to diminish glandular activity, after anaesthetization with a solution of cocaine-phenol. Small doses of aconitine every hour or two, according to the severity of the case, produce relief in one day and gradual recovery. L. Wainwright, of Folkestone, ² _{July 15} has found menthol very useful. It acts best, he states, when placed in an ordinary smelling-bottle, mixed with carbonate of ammonia, and used as smelling-salts. "Patients say all irritability disappears, and in many cases they get no return of the symptoms." J. W. Stickler, of Orange, ¹ _{Oct. 15} gives warning against the free use of cocaine in hay

fever, and cites a case in which dangerous collapse took place. Anorexia, constipation, insomnia, exhausting diaphoresis, and undue nasal congestion are the effects to be feared.

MISCELLANEOUS REMEDIES AND INSTRUMENTS.

Camphor-Thymol.—Having brought camphor and thymol in contact, S. S. Bishop, of Chicago,¹⁰⁰⁷ observed that a clear, oleaginous liquid was formed, which, applied to the turbinated bodies, blanched and shrunk the membrane, greatly increasing the diameter of the canal and limiting the discharge. A 5-per-cent. solution in lanolin was found very useful in hay fever, while a 25-per-cent. solution was found indicated in a case of hypertrophic rhinitis. Bishop emphasizes the necessity of selecting a solution of proper strength, a first application to an oversensitive membrane of a stronger solution than 3 or 5 per cent. acting like an irritant. He speaks highly of its virtues in the treatment of aural affections also.

Antipyrin.—Solutions not less than 30 per cent. in strength were found by Saint Hilaire, of Paris,²⁸⁶ to produce anæsthesia, though not as satisfactorily as cocaine, lasting from one to two hours. He considers it of value where prolonged analgesia is required. E. B. Gleason¹⁹ found it of great value, in 4-per-cent. solution, to prolong the anæsthesia produced by cocaine. It reduces the local blood-supply and limits secretion. It produces a most disagreeable smarting in the nose, which, however, soon passes away; but Gleason considers stronger solutions than 4 per cent. as too irritating. He classes the drug as a valuable analgesic and anti-spasmodic, whose effects can be maintained by repeated applications.

Pyoktanin.—R. P. Lincoln, of New York,¹ found this drug very efficacious in determining complete resolution in a case of abscess of the frontal sinus, in 4 of empyema of the antrum, and in 1 of suppurating ethmoiditis. He considers the remedy most useful when ulceration of the mucous membrane and suppuration are present. In several instances erosion and unhealthy granulations on the septum were healed in a short time. Like Bresgen, he found it useful after cauterizations. It may be used in any strength, and can be applied in the form of spray, ointment, powder, or crayon.

Cresol-Iodide.—Petersen, of Wurzburg,³⁴ and von Szoldrski, of Heidelberg,³⁴ after a series of experiments, recommended cresol-

iodide in disorders of the nasal membrane in which copious secretion is the main element.

Nasal Irrigation.—J. B. Ball, of London, ⁶_{Mar. 14} recommends Pin's (of Vienna) method of nasal irrigation. Pin's apparatus consists of a bottle of suitable size, fitted with an India-rubber cork, through which pass two glass tubes of unequal length. The longer tube reaches to the bottom of the bottle, and is furnished at its upper end with an olive-shaped nozzle to fit the nostril. The shorter tube does not quite reach the upper surface of the fluid, and its upper end is bent to form a mouth-piece. The patient takes the mouth-piece between his lips, while the olive-shaped nozzle is fitted into one nostril. He then blows into the bottle, *with cheeks distended*, and the fluid is forced up into the nose, and flows out at the other nostril. With short pauses for respiration, in which he takes in a full inspiration, a pint ($\frac{1}{2}$ litre) or more of fluid can be passed through the nose in a few minutes.

It is known that when one expires forcibly, with the mouth closed and the cheeks blown out, the soft palate is firmly contracted and shuts off the naso-pharynx. In using this apparatus, the expiratory force meets the resistance of the fluid in the bottle, and is sufficient to force it through the nose. At the same time the force with which the fluid enters is not excessive, and not likely to cause trouble. The shutting off of the upper pharynx is very effectual, the soft palate being strongly contracted and its under margin firmly applied to the posterior wall. The Eustachian tube is also thereby kept closed, and fluid is prevented from entering it. This instrument is worthy of special recommendation.

A. N. Strouse, of New York, ¹⁵⁰_{Aug.} presents a convenient atomizer that may be used for oils and watery solutions.

Inhalers.—G. A. Evans, of New York, ¹_{Apr. 19} contributes a pocket-inhaler, whose object is to correct the defective construction of instruments of that class whereby insufficient medicated surface is taken advantage of during inspiration, while during expiration the material employed becomes an accumulator of the waste products of the breath. It is made of glass; a large sponge can be inserted in the cup, and the expiratory current does not pass over it to contaminate it.

Snares.—C. A. Bucklin, of New York, ⁶_{Sept. 11} claims many ad-

vantages for a "new universal double-acting snare." The instrument somewhat resembles Wright's snare in construction and purpose, but presents a marked advantage in the fact that the handle and ratchet motion may be detached at pleasure, leaving in position an instrument suitable for the slow strangulation of a very vascular growth. A straight tip for the nose and curved tips for the naso-pharynx and larynx are provided.

Tongue-Depressor.—W. Hale White, of London, ^{Aug. 20}² hopes "to diminish the number of doctors who are victims to diphtheria" by contributing a spatula for preventing the patient from accidentally "expectorating onto the observer." The invention consists of a combination of head-mirror and tongue-depressor, by means of which the former acts as a shield while serving to illuminate the oral cavity.

Nasal Saw.—Veeder ¹₁₈₈₃ describes an instrument for vertical nasal-bone sawing, which consists of two arms, whose position can be altered by means of a screw, an endless saw working round the opening between these. An electro-motor supplies the motive power.

Nasal Forceps.—W. J. Walsham ⁶₁₈₈₃ adds an instrument to the list of forceps for correcting deformities of the nasal frame. It resembles Adams's, but one of the blades is larger than the other, and is concave inward to correspond with the convexity of the outer surface of the nasal bone; the smaller blade is convex inward to fit in like manner the concave inner surface. Both blades are smooth, and when the forceps are closed do not touch, so as to prevent as much as possible the crushing of the soft tissues. The handles are long, to give a more powerful leverage, since very considerable force in long-standing cases has to be employed to move the displaced bone. The forceps are made in pairs, a right and a left, and in three sizes, to suit the size of the nose and age of the patient.

Illuminating Apparatus.—H. de Haviland Hall, of London, ²_{Dec. 11, 1880} described a lime-light apparatus for laryngoscopic and rhinoscopic work of undoubted advantage to those who employ this kind of light. C. Niel Griffiths, of Cheltenham, ²_{Oct. 10} contributed what he calls a "New Portable Laryngoscopical and Aural Gas-Lamp Stand." The only novel feature of the instrument consists in a handle, by means of which it can be conveniently held in the hand, raised or lowered.

Mirrors.—L. Jankau, of Strasburg, ⁶⁹ Aug. 27 described a mirror suitably shaped to be passed through either nostril. The reflection of an ordinary rhinoscopic mirror in position into Jankau's instrument enables the operator to clearly see parts of the naso-pharynx which otherwise are not adequately examined.

Nasal Curette.—Bresgen, of Frankfort, ⁶⁹ Apr. 16 described a set of chisels and a sharp spoon for removing exostose and correcting deviations of the septum.

Tongue-Depressor.—G. C. Stephen, of London, ² Apr. 4 dilated upon the advantage of vulcanite over metallic tongue-depressors, and says that a thin coating of gutta-percha added to a Fraenkel instrument in his possession greatly added to its efficiency.

Palate-Retractors.—T. H. Weagly, of Marion, Pa., ⁹ Sept. 6 modifies White's retractor by diminishing the size of the cheek-rests and turning them into small knobs for insertion into the nostrils. The instrument is thus securely held in position. T. Potter, of Indianapolis, ⁸² Sept. 10 makes a skeleton White retractor out of brass wire, and does away with the handle, making a very light, inexpensive, and efficient instrument. Hopmann, of Cologne, ⁷⁴⁸ June modifies a Peyre Porcher-like instrument by connecting the palate-piece and the sliding face-piece by means of a rubber band. Energetic traction between the two is thus obtained.

The following general articles, although presenting no new facts, are, nevertheless, instructive and worthy of careful perusal: "Importance of Nasal Surgery and Nasal Therapeutics in the Treatment of Aural Catarrh," by Joseph A. White, of Richmond ⁸¹ Dec. 20; "Accidents that May Follow Intra-Nasal Operations," by M. Lermoyez ³⁷; "The Effects of Dry Atmosphere on Chronic Inflammation of the Larynx and Nares," by E. Fletcher Ingals, of Chicago ⁷⁹; "Diet and Exercise in the Cure of Simple Chronic Inflammation of the Chest, Throat, and Nose," by J. C. Mulhall, of St. Louis ⁸²; "The Physiology of the Nose as a Guide in Treatment," by J. A. Thompson, of Cincinnati ⁵³ May 20; "The Prevention of Colds and their Sequelæ by Surgical Methods," by W. Peyre Porcher ²¹⁵⁵; "General *versus* Local Treatment of Catarrhal Inflammations of the Upper Air-Tract," by R. Beverly Robinson, of New York ⁷⁹ Oct.; "The Aseptic Method as Applied to Intra-Nasal Surgery," by John O. Roe, of Rochester, ⁹ Mar. 28 a very strong plea, accompanied by indications for thoroughly protecting against

bacterial invasion the parts of the nose submitted to operative procedure; "Clinical Signs Common to Mouth, Nose, Throat, and Ear," by Harrison Allen, of Philadelphia¹¹²; "Bacteria of the Nasal Fossæ," by G. Deletti, of Naples¹⁶¹; "Nasal Disease as Related to the Eye and Ear," by E. J. Brown, of Minneapolis¹⁰⁵; "Contribution to the Pathological Anatomy of the Nasal Cavities," by J. Gradenigo, of Turin⁵⁷; "Bacteriology in Relation to Diseases of the Throat and Nose," by J. Macintyre, of London,¹¹ an elaborate and valuable review of the subject; "Some Suggestions in Regard to Intra-Nasal Pressure," by A. Ames Bliss, of Philadelphia,¹¹² containing many points of practical value; "Reflex Asthma of Nasal and Gastro-Intestinal Origin," by Bayer, of Brussels¹³⁶; "Hay Fever and Excessive Sneezing," by J. E. Bullock, of England,²⁶ a careful and succinct review.

DISEASES OF THE PHARYNX, NASO-PHARYNX, TONSILS, AND SOFT PALATE.

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TONSILS.

Anatomy and Physiology.—Articles upon these subjects have appeared by Collier, of London¹¹; by Gulland, of Edinburgh³⁶; and by Hodenpyl, of New York.²⁰⁷⁵ Collier, agreeing with Hodenpyl, points out the analogy between the faucial tonsils and Peyer's patches, and assumes that the same function is performed by both. Gulland believes that the tonsils—faucial, lingual, and pharyngeal—are organs arranged to further the production of leucocytes, and that these leucocytes pass to the surface of the tonsil, where they take up foreign bodies, especially micro-organisms, which would otherwise pass the tonsils, thus protecting the general system from the invasion of disease-producing germs. Normally, the tonsils have no absorbent function.

By far the ablest and most original contribution to the subject is the essay of Hodenpyl, whose article antedated Collier's by more than six months. His thesis is based upon original investigations made under unusually favorable conditions, and covers the anatomy, histology, comparative anatomy, and physiology of the tonsils. His experiments, performed for the purpose of determining the absorptive power of the tonsils, were conducted with elaborate care, and the results obtained may be regarded as thoroughly reliable. The following experiments were made to investigate the physiological action of the tonsils and to explain their power of absorption: 1. Olive-oil, melted lard, lanolin, finely-powdered carmine, and Berlin blue were smeared upon the tonsils and buccal centres of different animals. These were allowed to remain in contact with the mucous membrane for from fifteen minutes to one hour; the animals were then killed, and the tonsils, tongues, and walls of the pharynges examined microscopically.

(E-1)

Minute particles of the fats and colors used were found only in the most superficial epithelial layer; in no case had any absorption taken place. 2. Solutions of aniline colors and insoluble carmine were injected beneath the mucous membrane, in the vicinity of the tonsils. In one hour the animals were killed. Examination proved the tonsils had absorbed none of the coloring matter. 3. A small quantity of strong solution of atropine was injected beneath the mucous membrane of a dog's tonsil. In a few minutes the pupils became widely dilated; the dog shortly became sleepy and unable to stand. 4. Soluble and insoluble coloring matter was injected into the tonsils. Animals killed one hour later. Coloring matter found collected at point where tip of injecting-needle penetrated. No tendency to diffusion. No color reached the surface of tonsil or was found in crypts.

Summary.—1. Soluble or insoluble materials are not absorbed by the mucous membrane of the mouth or pharynx or tonsils, except to a very slight extent. 2. Tonsillar absorption is prevented by the epithelial covering. Substances in solution that penetrate epithelium may rapidly be taken up by lymphatics, and thus enter the general circulation. 3. The tonsils do not readily absorb either soluble or insoluble materials from surrounding tissues. 4. Soluble or insoluble foreign materials that may be in tonsillary substance are not thrown off by the free surface, but enter the lymphatic system.

In order to ascertain the frequency of tubercular tonsillitis, and to determine its relation to general tuberculosis, an examination was made of 200 tonsils from persons of all ages, 18 having died of tuberculosis pulmonalis. In only 1 case was a tubercular tonsil found, and that from a case of general tuberculosis. From these results it is probable that (1) tubercular tonsillitis is a very rare affection; (2) the tonsils are rarely, if ever, the site of primary inoculation in pulmonary tuberculosis.

Hodenpyl concludes with the following recapitulation: 1. The tonsils are lymphoid structures closely resembling the Peyer's patches of the small intestine, consisting in general of a congeries of lymph-nodules separated from one another by diffuse lymphoid tissue, which are arranged about several hollow depressions of the epithelial covering,—the crypts. 2. None of the theories thus far advanced to explain the functions of the tonsils are conclusive.

3. The tonsils produce no physiological secretion. 4. The tonsils are not absorbing organs. They neither absorb fluids or solid particles from the mouth under ordinary conditions, nor do they take up foreign materials from the tissues in their immediate neighborhood. 5. Tubercular tonsillitis is an uncommon affection. 6. There is no evidence to show that pulmonary tuberculosis ever results from absorption of tubercle bacilli from the mouth through the tonsils. 7. Rarefaction of the epithelium of the tonsils affords a ready explanation of the way in which the contagium of diphtheria may gain entrance to the general circulation in this disease. The thesis is elaborately illustrated, and in scientific method and accuracy is far in advance of any hitherto published.

Donalies ³⁸⁶_{Aug. 1, 1901} has furnished a scholarly article upon hypertrophy of the adenoid elements of the pharynx.

Acute Tonsillitis.—Silfverskiöld ¹¹_{Aug.} has observed this disease in 17.9 per cent. of acute internal diseases in children under 2 years of age, and in 27.6 per cent. of cases (epidemic diseases in both groups not included) among children 9 to 17 years of age. The first figure is probably too low, as the disease in the very young is often unrecognized. The symptoms are generally restlessness, thirst, cough, phlegm, and hoarseness, with often vomiting and diarrhoea. Coryza is sometimes present, and the breathing is quick and loud. Examination shows the faucial region swollen and bright red. Follicular tonsillitis has been rarely observed by the author, and quinsy never. Otitis is often present, and convulsions and stomatitis may also complicate it. The retromaxillary glands are frequently swollen and tender, but retropharyngeal abscess, as a consequence of the disease, the author has never seen. Le Gendre ³⁸_{Aug. 1} concludes that, in addition to primitive acute tonsillitis, the infectious nature of which he believes demonstrated, we should recognize the existence of subacute forms, maintained by an infection and manifested by adenopathy, albuminuria, or by general disorders, such as gastric troubles, nervous depression, and the like.

Rice, of New York, ⁵³_{Feb. 25} in summing up his conclusions on the subject of suppurative tonsillitis, states his belief in the following propositions: 1. That the tonsils, like other lymphoid tissues, are blood-elaborating glands. 2. That when they are in normal con-

dition they probably perform a second function by reason of the large number of leucocytes contained in them, and this function, if not aggressive, at least possesses the power to prevent the entrance of pathogenic germs through the crypts of the tonsil. 3. That when the tonsils have ceased to perform their function, by reason of such pathological conditions as interstitial thickening and occlusion of the lacunæ of the glands they probably present open-mouthed viaducts, through which pathogenic germs may pass to the lymphatic circulation. 4. That all kinds of tonsillar inflammation are due to septic causes, or, in other words, to specific germs, and that those causing follicular disease, parenchymatous disease, and peritonsillar abscess, are different from one another. 5. It is believed, therefore, that septic influences are the exciting cause of tonsillar inflammation, and that the presence of pathological tonsils—tonsils unable to perform their physiological function—is the chief predisposing cause. 6. That a classification of tonsillar inflammation into three varieties is sufficient, viz., follicular, parenchymatous, and peritonsillar abscess. 7. That suppurative tonsillitis is not a correct name, because the suppuration occurs in the connective tissue about the tonsils, and very rarely in the tonsils themselves. 8. That in people who possess the disposition to suppuration about the tonsils we find the tonsils either adherent to or covered by the pharyngeal pillars, and that this condition plays a more important rôle in the predisposition to suppuration about the tonsil than does the rheumatic or other diathesis. 9. That when a tonsil shows itself competent, at short intervals, to become inflamed or give rise to peritonsillar suppuration, it is in a pathological condition, and should be destroyed by the galvano-cautery or by other measures.

Tonsillar Hypertrophy.—Knight, of New York,⁶¹ reviews the treatment of hypertrophied tonsils, and advises that, in young children who are likely to be frightened by tonsillotomy, the operation be done with the patient under chloroform. Pynchon¹⁴⁹ _{Dec., '90} advises that, in the case of tonsils which, although diseased, are small and not sufficiently protuberant to admit of the use of the tonsillotome, the inflamed gland be dissected away by means of the galvano-cautery. He has devised a special cautery-knife for this purpose, and gives directions for the treatment of the acute inflammatory condition likely to result. [As such tonsils usually

swell under an acute attack, it is better practice in every respect to perform tonsillotomy while they are thus hypertrophied.—ED.] Gampert⁵⁷⁸ recommends that, in chronic lacunar tonsillitis the mouths of the crypts be freely laid open rather than that the organ be destroyed. Moure, of Bordeaux,²⁰⁵⁴ reports a case in which, following tonsillotomy, two unusual accidents occurred. The patient, aged 7 years, gave no history of hæmophilia. The tonsils, enormously enlarged, were removed without any unusual bleeding, and the hæmorrhage was soon entirely checked. That night during sleep hæmorrhage set in, and was only discovered upon the patient awakening and vomiting a large quantity of blood. The bleeding was checked, and nothing further occurred until the ninth day, when a somewhat severe secondary hæmorrhage took place. Moure refers to the rarity of secondary hæmorrhage after tonsillotomy, and quotes Ricardeau to the effect that in 53 cases of tonsillar hæmorrhage but 2 were secondary. While he believes that the galvano-caustic method may be indicated in the adult, he prefers tonsillotomy in children, because bleeding may occur after the use of the cautery,—both primary and secondary; acute otitis media may be excited, and acute tonsillitis and even quinsy may result. Thorner, of Cincinnati,⁵³ _{Sept. 12} reports the case of a man aged 25, in whom bleeding recurred one day after a tonsillotomy, and continued until much blood had been lost. It came from a single vessel near the top of the tonsil, and was checked by torsion. As two brothers of the patient had both suffered from profuse bleeding after the same operation, it is probable that the real cause in all was hæmophilia.

Dunn, of Richmond, Va.,¹¹² reports a unique case in which, following peritonsillar abscess in a child $3\frac{1}{2}$ years old, such severe hæmorrhage occurred as to require ligation of the common carotid. The child was perfectly healthy, and, with the exception of a trace of tuberculosis, of a healthy family. No history of hæmophilia. Two days after onset of attack examination showed marked inflammation of right tonsil and adjacent parts. On fifth day the abscess opened spontaneously, discharging a large amount of pus and considerable blood. The latter was quickly checked. From this time onward, throughout nine days, hæmorrhages took place daily. Some of them were severe. They were invariably stopped by styptic applications. On the ninth day a small lump was dis-

covered in the submaxillary region. This increased in size until, at the end of twelve hours, there was a pulsating tumor, two and one-half inches in length by one and one-half in breadth, extending from the mastoid process beyond the angle of the jaw. The tumor was evidently a false aneurism, and ligation of the common carotid above the omohyoid was at once performed. The tumor quickly subsided, and recovery was rapid and uninterrupted. It was impossible to determine the exact vessel involved in the ulcerative process, but from the character of the haemorrhages it appeared to have been one of considerable size. The abscess was more deeply seated than is usual. The youth of the patient and the peculiar character of the haemorrhage renders this case one of peculiar interest. Norton²⁰⁷⁸ reports a case of acute suppurative tonsillitis in a girl 4 years old, which ended fatally, the abscess having involved the carotid.

Cases of lymphadenoma of the tonsil are reported by Kendal Franks¹¹ and by Lennox Browne.¹¹ The cases were male and female, aged 46 and 48, respectively. Both suffered from general lymphadenoma; in both the presence of enormous enlargement of the tonsils was attended with constant discomfort, and at times with serious dyspnoea, and in both the removal of the tonsils was unattended with any danger and followed by distinct local relief.

New Growths of Tonsils.—Homans, of Boston, ⁶₁₄₂₉ reports a case of sarcoma of the tonsil removed by external incision from a woman aged 59. The right tonsil was enlarged to about twice the size of the left, but was not inflamed; projecting from its centre was a soft, red mass, of irregular surface and half an inch in diameter. An incision was made, two inches and a half long, from the right side of the hyoid bone to the mastoid process. The fasciæ were divided one after another, the edge of the parotid was pushed upward, and the submaxillary gland, with the tendon of the digastric muscle, downward. With the point of a director the constrictor of the pharynx and the mucous membrane in front of the tonsil were torn through. Scissors were used in the mouth, to divide the pillars of the palate and the mucous membrane around the tonsil. Forceps were then introduced through the wound in the neck, and the loosened tonsil pulled outward, while its attachments, which were on the stretch, were divided by scissors introduced through the mouth. Only two small vessels required liga-

tures,—a superficial branch of the facial and a small artery in the soft palate. The split in the pharynx, which was about two inches and a half long, was united by a continuous silk suture and a quill drainage-tube was introduced through the external wound. Dry iodoform gauze was applied with compression over the wound in the neck. The patient was discharged well at the end of two weeks. Homans adds a brief *r  sum  * of the subjects, and believes that pharyngotomy is not so dangerous as has been supposed. Of 25 cases operated upon for new growth of the tonsil 5 recovered; all of these were sarcoma, and in 2 of them the operation was by external incision. While Homans admits that he might have removed the tonsil in the case above quoted through the mouth he chose the external method, because he could thus get more room, more easily control h  morrhage, and remove a healthier margin with more boldness.

Wolff⁶⁹,_{May}, reports a case of primary carcinoma of the tonsil, which he removed by enucleation through the mouth. The ultimate result of the operation is not stated. Lefour¹⁸⁸,_{Apr. 15}, reports the case of a lady aged 29, who, during pregnancy, developed a large, pendent, fibrous polypus of the tonsil. It was easily removed.

Syphilis of Tonsils.—Moure and Raulin¹⁸⁸,_{Apr. 10} emphasize the fact that in secondary syphilis the adenoid tissues may undergo two changes: (1) inflammation, with increase of volume, and (2) the above conditions, together with the occurrence of mucous patches. In tertiary syphilis the adenoid tissue may be the seat of gummatous infiltrations which, in turn, may become the seat of ulceration. The symptoms, appearances, and diagnostic points are minutely given. By way of treatment, mixed treatment should be administered internally in the secondary conditions and such local applications made as the case may require, great care being taken to avoid all sources of irritation. Szadek¹⁰⁹,_{Jan.} contributes 4 cases of chancre of the tonsil, and gives a valuable *r  sum  * of the history of the subject, together with 60 references, including 177 recorded cases. Szadek's patients were all men, and in each case the right tonsil was affected. In no case was the precise mode of infection discovered. In 3 a well-marked induration persisted at the site of the sore. He believes that inoculation of the tonsil generally takes place through the contaminated saliva and not by direct contact.

Zelenoff¹¹ and Dumesnil⁷⁸⁶ both report cases analogous to the above in which the patients were men, the lesion upon the right tonsil, the cause of infection unknown, and the site of the sore indurated.

Natier⁹² describes the subjective and objective symptoms of gumma of the tonsils, explains the diagnostic differences of the disease, with acute and chronic tonsillitis, cancer, lupus, tuberculosis, calculus, hydatid cyst, hard chancre, diphtheroid mucous patch, and syphilitic ulcer; points out the course, duration, termination, and prognosis; and suggests the treatment, ending with the following conclusions: Tertiary gumma of the tonsil is rare, the author having been able to find but 5 cases. The etiology is obscure. There is no definite time after primary affection at which the lesion appears. Men are more frequently affected than women. Tobacco and alcohol seem to predispose to it, as do enfeeblement of constitution and neglect of early specific treatment. While gumma of the tonsil is generally indolent, it may, on the other hand, be excessively painful, as proved by the depressing effect observed upon the patient. Differential diagnosis is sometimes difficult, especially between gumma and chancre, mucous patch and syphilitic ulceration. While the course of the disease, under proper treatment, is generally favorable and the prognosis good, it sometimes happens that death may result from ulceration of the carotid.

Woolen's paper⁹¹ proves (1) that the normal tonsil in healthy fauces consists of nothing more than a loose aggregation of from twelve to fifteen solitary glands situated between the pillars of the fauces, and (2) that in diseased tonsils these conditions are so altered that the organ cannot fulfill its proper functions. Therefore, the enlarged tonsil is not an organ, and whatever function the normal gland may have had is, in the course of the pathological process, destroyed. In such cases the diseased tissue should be removed, and nothing of it should be left through fear, conservatism, or the impression that the remnant will subsequently atrophy. In a partial operation the crypts are laid bare more freely than ever and infection made all the more possible, while the broad base of the gland will be left to distend the space between the faucial pillars as before, and thus interfere with faucial action and with phonation.

UVULA.

Physiology.—Couëtoux, of Nantes,³⁷ presents some physiological studies upon the action of the soft palate during general muscular effort of the body, and shows that free nasal respiration is essential to the proper performance of its functions.

Edema.—Gaillard,¹⁵² reports 2 cases of acute œdema of the uvula. In 1 the uvula was so tumefied that it filled the isthmus of the fauces, causing no local symptom but pain. Although free scarification was practiced, and local applications of cocaine and chlorate of potash ordered, the organ did not regain its normal size for ten days.

J. Solis-Cohen¹³⁶ describes a case in which a uvula of considerable size was entirely inclosed in a fold of mucous membrane which was continuous with the anterior pillar of the palate, and which extended horizontally from one tonsil to the other. The uvula was set free by excision of the redundant membrane. Healing was quite rapid. The pre-existing irritation and cough disappeared.

Tumors.—Dunn, of Richmond,¹ describes a papilloma which was attached to the posterior aspect of the uvula, near its base, by a slender pedicle nearly an inch long. It gave rise to severe cough, which was at once relieved by its removal. Of 5 cases reported by him, 3 originated from behind the soft palate and 2 from in front of the posterior pillar. The patients were all healthy subjects under 30 years old.

Dundas Grant¹¹ operated successfully upon a fibrosarcoma of the soft palate through the mouth. The tumor was removed with comparative ease, and the patient made an excellent recovery.

Tuberculosis.—Ragoneau¹³⁶ reports a case of pulmonary tuberculosis, in which the larynx and the base of the tongue were the seat of tuberculous ulceration, which was cured by alternate applications of lactic acid, picric acid, and chloride of zinc. Shortly after their disappearance the patient complained of severe pain in the throat, with complete inability to swallow. Examination revealed a small tuberculous ulcer upon an intensely inflamed uvula. Attempts at treatment were unsatisfactory, the patient complaining of continued severe pain in deglutition. Barling² reports a case of primary lupus of the palate and larynx.

PHARYNX.

Anatomy.—Gellé¹¹ observed a case in which a large pulsating artery was seen upon the posterior wall of the pharynx, on the left side, but well inside of the lateral pharyngeal wall. He believed the vessel to be an anomalous left vertebral artery. In discussion, Moure said that he had seen 6 such cases, and referred to reports of similar conditions by American writers.

Fistula.—Cheatham²⁰⁷ has seen 3 cases of congenital pharyngeal fistula. All opened on the left side of the larynx. Colored fluid injected into the fistula passed into the pharynx, and a peculiar viscid fluid, with air-bubbles, escaped when pressure was made on the tract. For treatment, the author advised application of the galvano-cautery wire, commencing at the pharyngeal end.

Ulcers.—Masucci¹³⁶ states that his bacteriological researches confirm those of Heryng and Ludwig with regard to the benign ulceration described by the former. He believes that they have distinct characteristics of their own, and that they may be easily distinguished from other lesions. Generally the lesion is unilateral and single, oblong in shape, and apt to appear upon the soft palate. The ulcer is covered with a grayish-white membrane, which disappears in a few hours, leaving no trace of itself behind. He believes that the pathogenic agent is the streptococcus monophormus and the streptococcus variegatus.

Pharyngitis.—Pouzin,¹⁰¹² the author, describes herpetic pharyngitis, points out its nervous origin, and suggests for its cure: emollient gargles, applications to the herpetic spots of a solution of 1 part of caustic soda to 6 of glycerin, and, internally, aconite and opium. Sendtner,³⁴ in some cases of angina follicularis, sought for micro-organisms and discovered the streptococcus pyogenes only. He then extended his researches. The pus of 4 cases of angina follicularis and 1 of angina phlegmonosa contained only one streptococcus that, bacteriologically, did not differ from the streptococcus pyogenes and erysipelatosus. Further investigation will be required to show whether the diseases named are ever originated by any other organisms.

Höhlein, of St. Petersburg,²¹ reports a case of primary acute infectious phlegmon of the pharynx. The patient, 32 years old, had suddenly chills, fever, difficulty in swallowing, and a painful swelling in the pharynx. Next day there was a dis-

charge of slightly-fetid pus, with some improvement, followed in a short time by swelling of the neck, cardialgia, and oppression of the breast. That evening there was swelling of the glands and of the whole neck; somnolence, high fever, death. The post-mortem examination showed purulent infiltration of the connective tissue of the neck, purulent fluid in the pleural cavities, fibrinous purulent pericarditis, haemorrhagic erosions in the mucosa of the stomach, swelling of the spleen, and seropurulent mediastinitis. Foster, of Kansas City,⁵⁸ reports an interesting case of this disease in which death from laryngeal œdema was averted by intubation. Hanot¹⁰⁰ reports a case in which an acute pharyngitis was attended with serious symptoms, and finally resulted in death. Post-mortem examination showed that the cellular tissue of the retro-pharynx and œsophagus was extensively infiltrated, and the infiltration was found by the microscope to contain streptococci. The same micro-organisms were found in the abscesses contained by the tonsils.

Rendu¹⁴, relates the case of a servant who occupied the same sleeping-room with a number of others, several of whom, during an epidemic of *la grippe*, developed pneumonia. The first-mentioned girl was attacked with acute pharyngitis, in the course of which her saliva was found to contain the pneumococcus. The general symptoms of the case were much more severe than would have been expected from the condition of the throat, and strikingly analogous to those of the other cases. The author holds that all were due to the same cause, the infection in the last-described case being less profound than in the cases of pneumonia. Hajek, of Vienna,⁵⁷ reports several cases which appear to show that a chronic fibrinous pharyngitis may exist without any diphtheritic infection. In all there was developed in the pharynx a membrane which simulated diphtheria, and in several cases the membrane re-appeared at greater or less intervals after the first attack. In none was he able to detect bacilli. [These cases do not seem to have been proved non-diphtheritic, notwithstanding the author's failure to find bacilli.]

A somewhat rare case of pharyngitis is reported by Onodi.¹⁸⁶ The patient, aged 30, had observed that his sputa contained false membrane for three years. At that time he experienced some difficulty in swallowing, and suffered from pains which

appeared to arise from behind the soft palate. Since that time he observed, on the posterior wall of the pharynx, the development and separation of false membranes, which took place at intervals of a few days. Occasionally the visible part of the posterior walls of the pharynx remained free for three weeks at a time; but at such periods he experienced pain which radiated toward the ear, the fibrinous inflammation apparently spreading upward in the nasopharyngeal space. During the last year the affection underwent some improvement; but the patient suffered from considerable pain in the ear, headache, and depression of spirits, with occasional attacks of epistaxis. The nose itself had been free from membranes. The sputum, when microscopically examined, showed that the pseudo-membranes were of a croupous character, being composed of a fibrinous net-work, and containing micrococci. The only treatment that appeared to be of any use was insufflation with soziodololate of zinc and morphia.

De la Sota, of Seville, ²⁸⁶ _{Mar. 1861} reports 3 cases of primary gangrenous tonsillitis,—a disease of sufficient rarity to warrant its description here. In one case—a man aged 38—pulse and temperature were normal and general condition fairly good; the tongue was coated, the pharynx, larynx, and soft palate normal, except for slight congestion. The right tonsil was the seat of a large, grayish-black, depressed ulcer, and was increased to about double its natural size, and intensely inflamed. The odor from this was most offensive. The presence of large quantities of lepto-thrix buccalis was demonstrated. Under antiseptic and tonic treatment all 3 patients recovered. Not so in the case of Lutzet, ¹⁵² _{Apr. 10} which, occurring in a *badly* nourished patient, was attended with extreme anæmia, purpura, and finally death.

Foy ²² _{Oct. 1861} reports 2 highly instructive and very similar cases of retropharyngeal abscess in the adult. In both pressure of the abscess-sac upon the larynx caused alarming dyspncea, which was promptly removed by the opening of the abscess, accomplished by external operation, as follows: A long incision was made a little to the left of the median line. The superficial fascia was next divided, and the trachea and sterno-mastoid laid bare. The abscess-sac was found to extend upward behind the pharynx. It contained a large quantity of pus, but healed quickly without accident. Foy quotes somewhat similar cases from the ANNUAL, series

of 1889 and 1890, and refers also to others reported some years ago. ⁶ _{Oct. 9, 1889; p. 2077} A similar case is reported by Ambler. ² _{Sep. 19, 1890} Hudson ¹⁹² _{Mar.} describes a case, in a man of 40, complicating caries of the cervical vertebræ, in which death resulted from pyæmia.

Sokoloff, of Moscow,¹¹ presents an elaborate article on retropharyngeal abscesses of children, based upon 40 cases of abscess and 16 of lymphadenitis observed by him. He offers a new classification of the disease, and, passing to operative treatment, offers the following general rules: (1) typical retropharyngeal abscesses, situated entirely in the retropharyngeal space, should be opened by a sufficiently large incision through the mouth; (2) such abscesses as cannot be reached from the fauces, on account of their deep situation, should be opened externally, through the lateral aspect of the neck, as practiced by St. Germain; (3) the same procedure should also be employed in cases where the abscess is spreading toward the lateral surface of the neck, having passed under the external cervical aponeurosis outward from the vascular bundle; (4) traumatic phlegmon of the retropharyngeal cellular tissue and tubercular congestive abscesses must be always opened after the external method; (5) the latter prevents wounding the tongue, as well as the penetration of pus into the respiratory tracts. Having found ordinary pharyngotomes inconvenient, Sokoloff has devised a guarded scalpel of his own.

The same author ⁵⁸⁶ _{No. 8; May} ¹¹ describes a very rare form of disease of the retropharyngeal glands, namely, tuberculosis. As two typical cases from his practice show, the symptoms closely resemble those of retropharyngeal abscess, but differ from it in (1) simultaneous presence of tuberculous lesions of deep lymphatic glands on the corresponding side of the neck; (2) the affection persisting for months; and (3) in the fact that the retropharyngeal swelling cannot be reduced in size either by punctures or by incisions. The extreme rarity of the disease depends upon the usual absence of the glands in older children, in whom tuberculosis attacks lymphatics in general most commonly. Of 102 cases of tubercular lymphadenitis examined by the author, only 27, or 26.5 per cent., referred to children under 3 years of age.

Jacobs ¹¹ attributes certain cases of partial chorea, confined to the face, to catarrh of the nasopharynx, and believes that in these patients general chorea may sometimes result.

Rutten ¹¹ reports a case of division of the palatine arch, disclosing the bursa pharyngea and its orifice. He believes that the pouch described under the name of "bursa of Luschka" is not a bursa, but one of the median lines of glands transformed into a cystic cavity as a result of chronic inflammation. These parts of the palatine vault are more predisposed to troubles of secretion, and their glands, as a consequence of certain circumstances accompanying chronic inflammation, may suffer transformations, which are sometimes manifested as punctiform depressions, sometimes as pockets or cystic cavities. The term "saccular pharyngitis" seemed to him to be the best term to indicate this particular condition.

ADENOIDS.

Adenoid Tumors of the Pharynx.—The most important contribution of the year to this subject is the article of Lubet-Barbon, ¹¹⁸ in which he deals with some of the trouble caused by adenoid vegetations in very young infants. First recalling the observation of Dupuytren that ablation of enlarged tonsils in young children is often followed by failure in the relief of symptoms which we now recognize as due to adenoid obstruction of the upper pharynx, the author goes on to show that the alimentation of the infant is affected through the difficulty in nursing caused by nasal obstruction, whence the nourishment received is insufficient and defective. The respiratory troubles are well described, and the fact noted that they are all markedly exaggerated during sleep, to the extent of producing laryngeal spasm. Indeed, "in laryngismus stridulus adenoid hypertrophy is almost always present." The pharynx is generally filled with thick mucus, and the faucial tonsils, if not already enlarged, soon become so through the irritating effects of mouth breathing. Cough is an annoying symptom, and is sometimes so severe and paroxysmal as to simulate whooping-cough. Emphysema of the lungs is not rarely found in such children. Diagnosis of this condition is not difficult when all of the symptoms are collectively considered. That the cough is not due to tracheitis may be proved by the fact that pressing upon the trachea does not excite it. The diagnosis may always be established by careful digital exploration, which method is minutely described. Treatment consists in the removal of the growths with a modified Loewenberg forceps, preferably without anæsthesia, as at this early

age the vegetations are soft and easily separated. The author reports cases aged 1, 2, 6 and 16 months, respectively, and rightly urges that at no time in the child's life is the operation more safe, easy, or useful.

John Dunn, of Richmond,⁸¹ considers the same subject from a somewhat different stand-point and in older children. After describing its effects upon the nasal cavity he turns to the eye, noting the fact that in the victims of adenoid hypertrophy hyperopia and astigmatism are particularly common, as are phlyctenular keratitis and conjunctivitis, catarrhal conjunctivitis, marginal blepharitis, and eczema of the lids, the latter disorders being directly due to the catarrhal symptoms caused by the adenoids. The ear is also considered, and several valuable suggestions offered regarding it; the author agreeing with other authorities in the statement that the majority of acute earaches in children, as well as of chronic suppuration of the ear, are due to adenoids of the pharynx.

Bacon, of Hartford,²⁰⁰² quotes Kayser⁶⁶ to the effect that the upper regions of the nasal cavities are more concerned in the transmission of inspired air than is the lower meatus, which may account for the fact that some small adenoid growths obstruct the breathing out of proportion to their size, while, also, removal of large quantities does not always relieve the impediment to breathing if small fragments remain, provided the latter are situated above the nasal opening.

Max Schäffer, of Bremen,⁶⁹ reports a series of 1000 cases of adenoid growths of the pharynx treated by himself. Of these, 768 were treated surgically, 99 with the galvano-cautery, 81 by local applications, and 52 were merely observed. In 467 cases there was deafness; in 107, otorrhœa; 20 were improved, 331 cured. He describes cases in which were present struma, headache, asthma, spasm, stammering, and other complications. He removes the growth with Gottstein's ring-knife. He had never had severe bleeding. In the discussion, Lange, of Copenhagen, stated that in 700 cases of his own he had only seen severe bleeding once, and that in a hæmophilic subject. Hegmann had seen hæmorrhage twice. Narcosis was generally recommended. Kafemann¹¹⁸ states that, in 1100 boys, the pharyngeal tonsil was normal in 65.4 per cent., and in 86 cases there was hypertrophy. In three-fourths of the latter the hearing was defective and the drum-membrane

diseased; 12 of the children were so deaf as to be unable to follow the teaching. Of 1102 girls, there was hypertrophy of the pharyngeal tonsil in 10.6 per cent., and 29 of the cases were quite backward mentally. Hypertrophy of the tonsils was found 281 times. In 400 cases the buccal pharynx was the seat of granulations. The cartilaginous septum of the nasal fossæ showed irregularities in 191 cases. Hypertrophy of the nasal mucous membrane was found in 68 boys.

Our corresponding editor, Gouguenheim, of Paris, contributes an abstract of a thesis by his assistant, Cuvillier,²⁰⁷⁸ upon adenoid hypertrophy in the adult. This condition, although more common in the young, is still not infrequent in middle life. The growths are apt to become smaller and more dense as time advances. They are not uncommon at 40, and may be found as late as 60. Their histological structure does not differ from that of the growths seen in children, excepting in an increase of connective tissue. Their size may be sufficient to fill the pharyngeal space, the symptoms being the same as in childhood. Aural complications are common, and neuralgias and other reflexes more frequent than in early life. The dominant symptom, however, is persistent pharyngitis, which does not yield to any treatment not directed to the growth, which should be removed.

Ruault²⁰⁸ advises that the removal of adenoids be accomplished surgically, under anæsthesia, and with strict antiseptic precautions. Wagnier, of Lille,¹⁸⁶ _{Aug. 16} reports 6 cases in which a rapid cure of the middle-ear disease followed the removal of retrorstral adenoids, and attributes the result to the improvement effected in the condition of the Eustachian tube.

Roussaux, of Brussels,¹³⁶ _{June 11} describes a new galvano-caustic curette, made after the principal of Gottstein's ring-knife, for the removal of adenoid hypertrophies. The cutting-edge is represented by a platinum wire.

Edgar Holden, of Newark,¹ _{Jan. 1} presents a flexible curette, shaped at the tip like a finger-nail, which, by its elasticity, adapts itself to the pharyngeal vault, and can be rapidly used, even on a rebellious child, without the aid of an anæsthetic. This has been, in his experience, applicable to the majority of cases, especially of the fimbriated and cushion-like varieties.

Hieguet¹³⁶ _{Nov. 1} describes a modification of Gottstein's curette,

which is designed to remove all fragments of tissue from the parts immediately above the vomer and in the median line of the vault. The cutting-edge of the curette is heart-shaped. Boylan⁶¹ _{Oct. 10} produces local anaesthesia of the pharyngeal vault, prior to operation upon adenoids, by means of a hypodermatic syringe specially constructed for the purpose, and furnished with a guarded point.

Delie, of Ypres,¹³⁶ _{Sept. 15} reports a case of adenoid vegetations of the pharynx in a healthy boy of 13, in whom, six months after complete removal by operation of the adenoids, sarcoma of the pharynx appeared, and, although every effort was made to remove the growth, the patient finally died. Delie concludes (1) that adenoids may recur; (2) that recurrence should direct attention to the possibility of the development of a new growth, especially if the recurrence has been rapid; (3) that sarcoma is not always accompanied by severe haemorrhages; (4) that the result of microscopical examination should not always be taken in preference to the testimony of direct examination. Wróblewski, of Warsaw,⁵⁷ _{Oct. 11, 18} states that, of 160 deaf-and-dumb patients, 57.5 per cent. had adenoid vegetations of the pharynx.

Tumors.—In the treatment of nasopharyngeal fibromata and other allied conditions, it is gratifying to note, from year to year, the slow but steady growth of the ideas advanced long ago in this country by Lincoln, and the abandonment of the severe and dangerous methods formerly practiced. Migge²⁰⁷⁹ extols the removal of such growths without preliminary operation and reports 7 successful cases from the clinic of Michelson. Hansberg³⁸⁵ _{No. 1} reports a case of nasopharyngeal fibroma in a man of 30, which developed subsequent to an injury and which he removed thoroughly by means of forceps. The patient made a good recovery, and there was no return. Bark, of Liverpool,¹⁸⁷ _{July} successfully removed a myxofibroma from the upper and anterior part of the vault of the pharynx of a woman aged 32, while Wolfenden¹¹ _{May} removed one of unusual size, from a girl of 15, with a Jarvis snare. Macintyre¹¹ _{May} reports 1 case of round-cell sarcoma of the pharynx in a man of 48, the result being fatal, through extension of the growth, and another of sarcoma, also in a middle-aged man, in which the growth originated from the vault of the pharynx.

In a case of myxosarcoma of the nasopharynx which had resisted other treatment, Bryant¹ _{Apr. 11} ligated both external carotids.

Three years later the patient suffered no inconvenience and no pain whatever from the tumor.

Cases operated upon for retropharyngeal sarcoma are also reported by Lange,¹ and by Wilson.² Davis¹⁰⁵ treated a myxosarcoma of the vault of the pharynx by electrolysis, with excellent results. Hirschberg¹¹ reports 2 cases of sarcoma of the upper pharynx; one was operated upon and died. The other was treated by the galvano-caustic method and cured without recurrence.

Cheatham¹² attempted to remove a fibroma of the nasopharynx, from a boy aged 19, by means of the Jarvis snare, with which he surrounded part of the growth. The tissues were so dense that he could not force the cold wire through them. Removing the cannula and leaving the steel wire *in situ*, he replaced the former with the galvano-cautery handle and easily burned through the inclosed mass. Later, in removing another fragment of the growth, he found difficulty in adjusting the soft and yielding platinum wire to it. This he overcame by fastening the platinum wire to a piece of steel snare-wire by means of silk thread and introducing both together into the cannula of the cautery, only attaching the platinum, however, to the poles of the battery. He reports, besides, 1 case of myxofibroma, 1 of fibrosarcoma, 2 of sarcoma, 1 of carcinoma, and 1 of myxoma. He deprecates "preliminary operation" in these cases when possible to avoid it, and advocates galvano-cautery, the cold snare, or electrolysis. Kayser⁶⁹ reports a case of fibroma of the upper pharynx. Körte⁶⁹ performed a subhyoidean pharyngotomy for the extirpation of a pharyngo-laryngeal tumor in a woman aged 43. Preliminary tracheotomy was done four days before the operation, and the patient survived for eleven weeks. Aplaoni, of Kasan,²²⁶ removed a lipoma from the pyriform sinus by subhyoidean pharyngotomy. The immediate results of the operation were good. He finds 28 cases of the above operation in literature, of which 7 died. Lange, of New York,¹⁴ presented a patient to the New York Surgical Society from whom he had removed a pharyngeal epithelioma by external incision.

DISEASES OF THE LARYNX, TRACHEA, AND ESOPHAGUS.

By J. SOLIS-COHEN, M.D.,

PHILADELPHIA.

LARYNX.

Anatomy.—Chiari⁸⁸ describes a new form of triple division of the trachea discovered in a boy, who had other anomalies of formation, including abscess of the spleen and dislocation of the hepato-duodenal ligament. The third bronchus originated in the left side of the trachea and terminated in the third lobe of the lung. Lejars, of Paris,⁹¹ contends that the trachea in the young living subjects differs much in size and shape as that in the cadaver. A duplicated pair of aryepiglottic folds, separate from the normal folds above which they were stretched, bridging the Wrisberg cartilages and attached to the Santorini cartilages, has been described by W. Anton, of Prague.⁸⁸

Gustatory innervation of the larynx has been proved experimentally by P. Michelson,²⁰ under direction of Langendorff. A probe tipped with quinine, saccharine, etc., was cautiously brought in contact with the mucous membrane. The localizations of the sensation were accurately described by the majority of the subjects experimented upon. Electric contact produced acid taste at the anode and alkaline at the cathode. R. Wagner,⁸⁸⁴ experimenting upon cats, found that section of the recurrent nerve produced median position of the corresponding vocal band, which maintained that position for two or three days, and then assumed the cadaveric position. If, however, the superior and median laryngeal nerves were severed immediately after section of the recurrent, then the median position of the vocal band changed at once to the cadaveric position. Hence the inference that the median position after paralysis of the current must be due solely to the action of the crico-thyroid muscle.

Some experimental researches on the action of the recurrent nerves on the glottis, made by Ch. Livon,¹⁶ confirm, in the strongest manner, the conclusions of Hooper, of Boston, though the method of anæsthetization differed. Livon anæsthetized his dogs with intra-peritoneal injections of chloral and morphine by the process of Ch. Richet. Dilatation of the glottis was produced by slow interruptions of feeble and moderate currents of induction, while occlusion was produced by rapid interruption of currents of all strengths employed, and by slow interruptions of strong currents. Fatigue of the muscles played no part in these alternations between occlusion and dilatation. Simple opening of the glottis was never produced experimentally without presenting rhythmic muscular contractions at the same time. Two clinical cases, reported by J. Neumann, of Budapest,¹⁷ conclusively show that the muscles innervated by the inferior laryngeal nerves in these instances received no secondary innervation from the superior laryngeal. In one, a case of bilateral total paralysis of the recurrents, both recurrents were imbedded in masses of enlarged glands, and the superior laryngeal nerves were found intact on microscopical inspection. In the other, a cut-throat case, the superior laryngeal had been severed, but there was no other change noted, laryngoscopically, than the retention of the corresponding vocal band at a higher level during phonation,—a position explained by loss of function of the corresponding crico-thyroid muscle.

Physiology.—Our corresponding editor, A. Gouguenheim, of Paris, calls our attention to a paper, by Nicaise,¹⁸ who has demonstrated that the trachea undergoes dilatation and elongation at the moment of vocalization, thus applying an auxiliary force to the inspiratory muscles. He affirms that the persistent dilatations of the trachea in singers are produced in this manner by abuse of the voice. He likewise refers to a paper, by F. Lejars,¹⁹ on the physiological form and calibre of the trachea, and the active rôle of the musculo-membranous portion. Their contractions, he contends, produce a continuous diminution of the calibre of the trachea, which is its physiological condition in a state of repose. During strong vocal effort, as in crying and in singing, the trachea, he states, becomes elongated, and its calibre augmented. The calibre is quite sensibly smaller during life than after death. During life the trachea is larger above than below. Hence, the intro-

duction of a large cannula may be more difficult after a low tracheotomy than after a high one, and the indication would be not to use too large a cannula. [In this connection, I would state that I usually perform the low operation, and have never experienced any difficulty in inserting the fullest-sized cannula suited to the size of the subject.]

Photographing the Larynx.—Richard Wagner⁴ _{Dec. 8, 18} is photographing the mouth and larynx with considerable success, and even intimates a possibility of photographing the larynx in colors.

LARYNGITIS.

Acute.—A case of acute laryngitis, caused by insufflations of calomel while the patient was taking potassium iodide, has been recorded by Kanasugi, of Tokio.⁴ _{Sept. 7} Inasmuch as œdema of the larynx occasionally takes place under internal administration of potassium iodide without any topical medication whatever, and as both remedies were effectively withdrawn together in the instance recorded, it is hardly proper to refer the laryngitis to the influence of mercury resulting from the combined treatment. Richard B. Faulkner, of Allegheny, Pa.,¹ _{Apr. 11} claims that strychnine in large doses will restore the voice, for temporary use, with greater certainty than any other resource. He denounces the habitual use of alcohol by singers.

In reporting a case of hæmorrhagic laryngitis in a healthy woman 30 years of age, two months gone in pregnancy, Treitel,⁴¹ calls attention to the fact that 3 out of 6 cases reported by Strübing occurred in females during pregnancy or shortly after.

Laryngitis of Typhoid Fever.—Our corresponding editor, Gouguenheim, calls attention to a minute study of these affections by Peter.¹⁷ _{Mar. 10} These lesions may present at two periods of the malady. At the commencement the laryngites are very common and are ordinarily benign, rarely penetrating into the deeper tissues. It is ordinarily during convalescence, two months after the commencement of the malady, that the severer form of laryngitis is developed, a form fatal in the absence of prompt relief by tracheotomy, and leaving deformities which necessitate the indefinite retention of the cannula. These lesions usually involve the arytenoid, epiglottic, and cricoid cartilages. Peter combats this complication with applications of vesicatories in the front part of the neck.

Chronic Laryngitis.—Chronic circumscribed laryngitis may be attended, according to Reichert, of Berlin,¹⁰ with three forms of ulceration: catarrhal, folliculous, and glandular. The last is infrequent and insidious, and is due to inflammation and suppuration of certain mucous glands, especially in the subchordal portion of the vocal bands. Circumscribed hyperplasias are severed with properly curved lance-pointed knives, and are then cauterized with solid silver nitrate. Flaying of the vocal bands, as recommended by Labus, some years ago, in that nodular disease described by Türck as tuberous chorditis, has been successfully practiced for restoration of the singing voice by C. Corradi, of Verona.⁵⁸ The writer seems to consider this affection the same as that described by Virchow as verrucous pachydermia, judging by the inclusion of the terms *Pachydermia verrucosa*, Virchow, and *Chorditis tuberosa*, Türck, between the same pair of brackets. In the former disease the nodules are posterior and lateral and occur chiefly in males addicted to singing under the influence of their cups, while in the latter the nodules occupy rather the superior surface and edges of the vocal bands and occur almost exclusively in female vocalists. The former is sometimes confounded with malignant neoplasm; the latter, never.

Tuberculous Laryngitis.—A specimen of sloughing ulceration of the pharynx and larynx of a child 20 months of age, dead of catarrhal pneumonia and miliary tuberculosis, was shown by H. Ashby² to the Manchester Pathological Society. Intubation had been successfully practiced for urgent dyspnœa from laryngeal stenosis, the tube being removed the fourth day. Death occurred, six weeks later, after measles. There was ulceration of the vocal bands and of the trachea at a point corresponding with the end of the tube, but this ulceration was found to be inflammatory and not tuberculous, though there were miliary tubercles in lung and liver. There was also extensive superficial ulceration of the pharynx on both sides, exposing the muscular layer. A case of fatal tuberculosis of the larynx in a child 13 months of age is reported by Rheindorff.³⁰ It ensued upon congenital syphilis with pseudo-paralysis.

A specimen from a case of proliferative laryngitis simulating papilloma is described by Dundas Grant.¹¹ George Avellis⁶⁹ details some 13 personal illustrative cases of tuberculous morbid

growths, seen within five years, and other reported cases, and concludes that they must be regarded as a special form of primary laryngeal phthisis. They are most frequent in the ventricle, beneath the angle of the glottis, and on the posterior wall; less frequent on the ventricular bands, and least frequent in the vocal bands. The mucous membrane is not ulcerated, but is sometimes congested, sometimes grayish or yellowish white. They are mostly broadly sessile, and contain giant-cells and tubercle bacilli. They are of slow growth. Some tumors have been of nine months' standing, and even longer. They do not cause pain, but do cause hoarseness and stenosis. They are most frequent in young people. They are to be regarded as benign growths, the operative removal of which is followed by satisfactory and at times by brilliant results.

Treatment.—In view of the great discrepancy in the character of the reports of cures and failures from tuberculin, we deem it best to lose no space in furnishing abstracts, and to merely state that its virtues are not sufficiently established to justify its use under the actual risk of doing injury rather than good. The acid salts of cantharidin are lauded by Liebreich, Heymann, Fraenkel, and Guttmann.¹⁶⁴ Tannic medication is highly praised by G. Arthaud¹⁶⁵ in a statistical record of some 2000 cases treated during the last six years. From 2 to 4 grammes ($\frac{1}{2}$ to 1 drachm) a day are given in a vinous solution or in an iodized solution, as follows:—

R Potassium iodide,	10 grammes (2 $\frac{1}{2}$ drachms).
Or tinct. of iodine,	5 grammes (1 $\frac{1}{4}$ drachms).
Tannin,	80 grammes (1 ounce).
Glycerin,	200 grammes (8 $\frac{1}{2}$ ounces).
Alcohol,	50 grammes (1 $\frac{1}{2}$ ounces).

A tablespoonful at a dose, in wine.

Fifty per cent. of cures are claimed, and 30 per cent. additional of amelioration.

Favorable reports from scraping and from cauterization with lactic acid and the like are given by Delavan,⁷⁷¹ Hardie,¹⁴⁹ Luc,¹⁸⁶ Heryng,³⁷ and Schaeffer.⁶⁹ Heryng,³⁷ in particular, continues to follow the subject up very closely; and, in an extended inquiry as to whether radical cure of phthisis of the larynx can be maintained by endolaryngeal surgical treatment, he answers affirmatively in the most emphatic manner. While acknowledg-

ing that, unfortunately, the great majority of cases remain incurable, despite lactic acid and curetting, and that recurrences are imminent in cases apparently cured, he contends that it is the duty of the practitioner to combat the malady as thoroughly as possible to mitigate suffering, to prolong existence, and to give an opportunity for cure of the larynx and re-establishment of its functions. He mentions a number of cases of cure from frictions with lactic acid simply, and, in severer instances, from similar frictions, after preliminary curetting or sponging away the diseased tissues.

In this connection he describes a cicatrized tuberculous larynx (see figure), showing that there had been complete cure in a

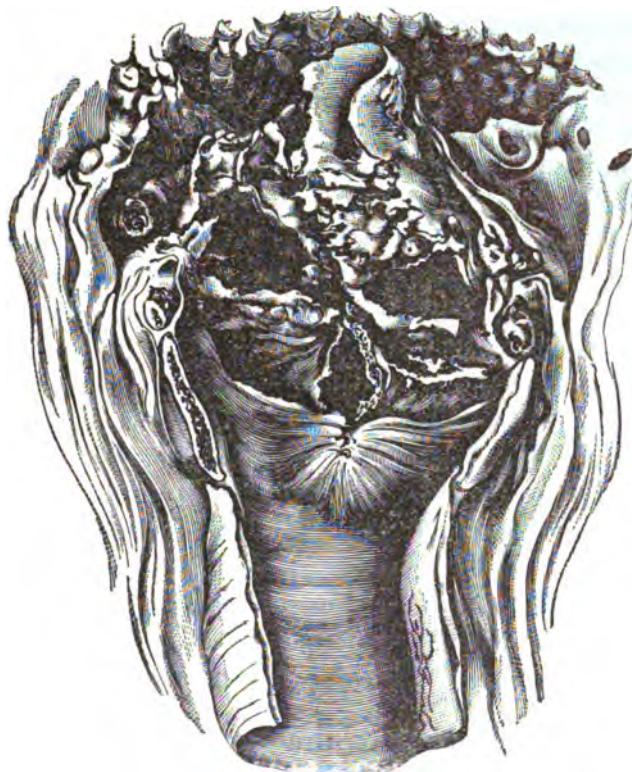


TUBERCULOSIS OF LARYNX.
(*Annales des Maladies de l'Oreille, etc.*)

case of extensive infiltration of the epiglottis, of the ventricular band of the cartilages of Santorini, with deep ulcerations in the posterior wall of the larynx; and that this cure had been maintained for several years, without recurrence, despite simultaneous progression of the pulmonary lesions, to which she eventually succumbed. The complete cicatrization of laryngeal lesions had been confirmed by Virchow.

Operative Procedures.—Laryngo-fissure with eradication of the tuberculous masses, tumors, and infiltration, was successfully practiced by L. Grünwald, of Munich,³⁴ upon a female subject 30 years of age, who had suffered from hoarseness for some three or four years. There was some trouble with the cicatrix, but the stricture was eventually overcome. There was no pulmonary dullness in this case. The right apex was somewhat lower than the left, and there was prolonged expiration under the right clavicle. There was diffuse bronchial catarrh.

Syphilis and Tuberculosis of the Larynx.—Evidences of the co-existence of tuberculosis of the larynx with syphilis of the larynx, as demonstrated by Schnitzler, Fasano, and others, receives additional support from Schnitzler,³⁵ Rees and Wolfenden,³⁶ and Massei.³⁷ We present an illustration from Schnitzler's paper,

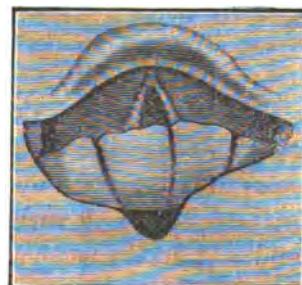


SYPHILIS AND TUBERCULOSIS OF LARYNX.
(*Medical Press and Circular.*)

SYPHILIS OF THE LARYNX.

Our corresponding editor, Massei, of Naples, calls attention to a form first described by him as gummous syphilis of the vocal band, and refers to an instance illustrated by Poli, of Genoa.⁴⁶¹ This curious localization, without impairing voice, produces dangerous constriction and closely resembles the laryngoscopic picture of what is usually described as *chorditis vocalis inferior*. Jonathan Wright,^{1,12} reports 2 cases of tracheal syphilis, and presents an excellent summary of the subject.

Spillmann¹⁸⁴ exhibited to the Medical Society of Nancy the larynx of a man who had had stridor and respiratory troubles



GUMMOUS SYPHILIS OF VOCAL
BAND.
(*Archivii italiani di laringologia.*)

simulating compression of the recurrent nerves by a morbid growth. He died suddenly, asphyxiated before there was time to perform tracheotomy. Considerable œdema of the glottis was discovered at the autopsy, with necrosis of the arytenoid and cricoid cartilage. The patient had had syphilis five years previously, which had never been treated. Mayo Collier¹¹ relates a case of symmetrical syphilitic growth in the vocal bands of a man 30 years of age. They diminished in size almost to disappearance under internal administration of mercury perchloride and potassium iodide, but grew again on discontinuance of the remedy. Camillo Poli, of Genoa,⁴⁶¹ read a paper on "Syphilitic Gumma of the Larynx" before the Laryngological Section of the Fourteenth Congress of the Association of Italian Physicians of Siena. Moure presented before the Society of Medicine and Surgery of Bordeaux¹⁸⁸ a sailor, 70 years of age, with a syphilitic gumma of the cricoid cartilage. At the anterior and inferior portion of the neck, below the thyroid cartilage, was a tumor the size of half an orange, the inferior portion of which rested upon the sternal notch. Under a biniodide solution the size of the tumor rapidly diminished.

MORBID GROWTHS OF LARYNX AND TRACHEA.

The usual proportion of morbid growths has been reported during the year. Before making mention of them, I would call attention to an excellent paper by Jonathan Wright, of New York,⁶¹ on subglottic neoplasms, and to a paper by W. S. Laton, of Minneapolis,¹⁰⁵ on the general subject of laryngeal neoplasms; likewise, to an unusual and probably unique instance of death following endolaryngeal extirpation of a laryngeal polyp reported by Grünwald.³¹² The patient was a male, 63 years of age, subject to arterio-sclerosis. Tumors removed from his vocal bands with forceps and guillotine had been recognized as benign. Recurrences were removed by incision from their bases, and the detached structure removed with the snare. Hæmorrhage ensued, which could not be arrested with ice externally nor electro-cauterization topically. Tracheotomy was performed and the larynx was tamponed from the mouth, arresting the hæmorrhage, but nevertheless the patient died on the following day.

Since the epochal paper of Virchow, in 1887, on pachydermia of the larynx, quite a number of others have appeared under similar

title, some describing the same lesion; some analogous lesions; and some chronic laryngitis with thickening. Among them we may refer the reader to those of Chiari, ¹⁸⁶ Jan. Brebion, ¹⁸⁶ Feb. Polewski, ³⁸⁶ Apr. Wolff, ⁶⁹ June Meyer, ¹⁸⁶ Feb. 15 and Krieg. ¹⁸³ Nov. 21, '90. A number of articles on this form of chronic laryngitis or of quasi tumor, as it is variously regarded by different observers, have appeared during the year, notable among them being the elaborate paper of Paul Tissier. ³⁷ July, Aug.

Papillomata.—Multiple papillomata were removed endolaryngeally by E. Fletcher Ingals, of Chicago, ⁶¹ Feb. 7 from a boy 3 years of age. Recurrences ensued, and, in spite of the most judicious treatment, severe bronchitis occurred finally, with fatal result in ninety-six hours. Unfortunately an autopsy could not be secured. Bornemann, of Berlin, ⁶⁹ Apr. 9 reports 4 cases of multiple papillomata in children observed in the clinic of Fraenkel. In 1, laryngo-fissure was performed, but the voice remained impaired. In another, tracheotomy and laryngo-fissure enabled removal with sharp spoon and forceps, but recurrence took place, with death by pneumonia some months later. In a third case laryngo-fissure was followed by recurrence. The only successful case was the fourth one, removed endolaryngeally with forceps.

Garel, of Lyon, ³ May 6, ³⁷ June reports spontaneous recession of a papilloma after tracheotomy, occurring in a girl 4 years of age, whose laryngeal disease had followed influenza in 1890.

R. Kohler, ⁶⁹ June 11, reports a case of multiple papillomata in a child 14 months of age. Superior tracheotomy was performed; then laryngo-fissure. When the lower portion of the thyroid cartilage was divided, the hanging head permitted excellent vision of the anterior commissure of the glottis and completion of the section without wounding the vocal bands. Recurrence ensued. Eight weeks after the operation the patient died of faucial diphtheria.

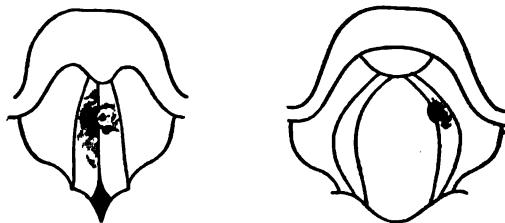
F. Semeleder ¹⁷⁹ Jan. 16 reports a case of papilloma the size of a pea beneath the anterior angle of the rima glottidis of a girl 8 years of age. Laryngo-fissure was performed, and the tumor removed. Recurrence ensued. During a paroxysm of cough and suffocation the patient pulled out the cannula and fell dead. A. B. Thrasher, of Cincinnati, ⁵³ July 4, reports 2 cases in adults successfully treated by endolaryngeal procedures. A case of multiple congenital papillomata, in association with warts on the hand, in a child 10½ years

of age, and which have resisted all sorts of topical treatment by astringents, cauterization, and evulsion, is recorded by Rees.¹¹ _{July}

Our corresponding editor, Gouguenheim, sends us an unpublished record of a congenital confluent papilloma of the larynx. The patient was a girl, 5 or 6 years of age, whose general health was excellent. Gouguenheim had to perform tracheotomy, and requested Périer, surgeon of the Lariboisière hospital, to perform a cricothyrotomy for radical extirpation of the morbid growths. That surgeon extirpated some papillomata inserted upon the two lips of the glottis, especially inferiorly. The voice did not return, however, and the patient cannot tolerate occlusion of the cannula. Recurrence ensues despite electric cauterization of the points of insertion, and a second external operation is proposed.

Fibromata.—Pre-epiglottic fibrous tumors are discussed by C. Laurent, of Brussels.¹² _{June 15} A case of laryngeal fibroma, removed with electric cautery, in a man with an aortic aneurism, is related by Price Brown.³⁹ _{May}

A peculiar morbid growth in the vocal bands of singers, almost exclusively in females, and far most frequently in sopranos, consists in an interstitial nodulation, widely known as tuberous chorditis, and well shown in the accompanying sketches from a



CHORDITIS TUBEROSA.
(*New York Medical Journal.*)

paper by Clarence C. Rice, of New York,¹ _{June 14} based upon 8 cases seen within the last two years. Rice attributes the lesion largely to faulty method in singing and consequent friction at the points of development. Sections from two nodules removed with a guillotine showed connective-tissue and epithelial elements in large numbers. As seen in the sketches, the nodules are usually located a trifle more anteriorly than midway between the vocal processes and the anterior insertion of the vocal bands; and sometimes a depression will be produced in the opposite vocal band (see figure),

into which the nodule will fit. Rest of the voice, removal of the nodule (preferably with a small snap-guillotine), and subsequent cauterization with zinc-chloride solution constitute the essential factors in treatment as pursued by Rice, to which is added proper use of the voice after full recovery.

Myxoma.—An instance of recurrent myxoma is related by Raulin,⁴⁶ the polyp having recurred *in situ* on the left vocal band, and a new neoplasm having emerged from the ventricle of the same side. This recurrence is attributed to the fact of its implantation on the inferior face of the vocal band and in the ventricle, points from which the growths could not be thoroughly eradicated without external incision of the larynx,—an operation to which the patient refused assent. In 1873 this patient, now 50 years of age, was treated by Krishaber for a lesion of the epiglottis, cicatrices of which are still visible. In 1886 Moure removed some hyaline myxomas occupying the two vocal bands in their entire length, and in January, 1891, the recurrence above mentioned was noted. Ad. Dudefoy⁴⁷ reports an enormous myxoma obstructing the glottis of a man 46 years of age, and adherent to the left side of the larynx, successfully removed with endolaryngeal cutting-forceps.

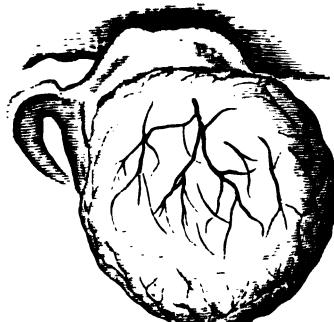
Cystoma.—Thost⁴⁸ reports an instance of blood-cyst of the vocal band in a man who had become hoarse two years previously after a cold drink. A minute, bluish-red, round, tense tumor was seen in the anterior border of the left vocal band. It was cauterized with the electric cautery, which secured immediate relief and subsidence of hoarseness. The stump was further diminished in size by cauterization, and the patient's voice again became loud and distinct.

A serous cyst of the epiglottis has been reported by Raulin,⁴⁶ in a male singer 35 years of age. It occupied the superior extremity of the right side of the lingual face of the epiglottis, and had been discovered by accident some years previously, and was usually of the size of half a cherry, though varying in volume from time to time. Its etiology was attributed to the habitual ingestion of very hot drinks,—milk in this instance. It was destroyed by means of the electric cautery. In a paper on cystic formations in the vocal bands, by Chiari,⁵⁷ their formation is attributed to an ill-defined softening process in the connective tissue of fibromas, and not to retention processes in gland-ducts.

The physical resemblance of certain cystomas, especially while small, to tumefactions in the arytenoid regions due to œdema and to tuberculous infiltration, is apt to confuse the inexperienced observer. We present, therefore, illustrations of 2 cases reported since our last issue,—one by Garel, of Lyon,⁵¹ and the other by Casselberry, of Chicago.⁵² Both these cases occurred in young women, 23 and 25 years of age respectively. Both furnished clinical histories of obstruction in the laryngeal region since childhood,—one an obstruction in respiration and the other an obstruction in glutition. In one, the symptoms were suddenly augmented by fright six months before the patient came under Garel's observation, and in the other an exposure to cold culminated in acute pharyngo-laryngitis about six weeks before the patient came under Casselberry's observation.



CYSTIC FIBROMA OF LARYNX.
(*Annales des Mal. de l'Oreille, etc.*)



CYSTOMA OF LARYNX.
(*Journal of American Medical Association.*)

Garel's case was reported as a voluminous cystic fibroma, removed endolaryngeally from the right aryteno-epiglottic fold of a female 23 years of age. The electric incandescent snare was used, and the section was somewhat laborious, but there was no haemorrhage. Eight days later a slight red patch at the region of junction between epiglottis and aryepiglottic fold presented the last vestige of the point of implantation.

The oval fibrous tumor was found to contain three cystic cavities, one of which was equal in capacity to the other two, which were separated only by a thin wall. The large one was superficial. The cavities were filled with a more or less viscous, gray liquid.

Casselberry's case was still more voluminous. Tracheotomy

was performed, and a few days later the cyst was emptied by aspiration of some viscid, olive-colored liquid, sufficiently albuminous to solidify in boiling, but by the next day it had nearly regained its former size. It was then emptied by incision, and the walls were separated in fragments from their attachments by the use of the incandescent electric snare, electric knife, and long, angular scissors. The remnants were subsequently removed endolaryngeally, as well as the cartilages of Wrisberg and Santorini, while the upper neighboring parts of the aryepiglottic fold, interarytenoid fold, and ventricular band were destroyed. This was done under the fear that the neoplasm might be a cystic sarcoma, as was doubtfully predicated from microscopical inspection of the main mass.

Scleroma.—A scleroma of the left vocal band, in a girl of 10 years of age, was recently exhibited by Zuffinger to the Medical Society of Vienna.¹¹ The microscopical examination of an excised piece demonstrated the presence of scleroma bacilli.

Angioma.—Angioma has been reported by Lennox Browne.¹¹ A supposed angioma of the left pyriform sinus, removed by Semon² with the electro-caustic snare, was found, on microscopical examination, to be a genuine papilloma, completely cased in a shell of partly recent and partly organized blood.

Mixed Tumors.—L. Grünwald, of Munich,³⁴ relates an instance in a 3-year-old child, from whose larynx, after tracheotomy, he removed a fibroma from the base of the epiglottis endolaryngeally, and subsequently removed several masses of cauliflower papillomata after direct access by laryngo-fissure. At a later date recurrent papillomata at the base of the epiglottis were removed with the snare.

Sarcoma.—Gevaert³⁷ reports a case of cure of an interarytenoidal sarcoma in a woman 58 years of age. It had acquired the bulk of a chestnut. It was extirpated at the first attempt, and there had been no recurrence.

Carcinoma.—Cases of carcinoma have been recorded by Lavrand,²²⁰ Burt,³⁹ Stoker,¹¹ Dundas Grant,²² and others. A case of carcinoma of the larynx, trachea, and lungs has been recorded by Schifflers.³⁷ There was complete luxation of the left arytenoid cartilage, and the crico-arytenoid muscle was paralyzed. The etiology is discussed by Neumann,⁸⁴ who details the clinical pre-

gression of a case of carcinoma developed from a pre-existing general infiltration or thickening of several years' duration, and briefly describes another somewhat similar instance.

Cases of carcinoma treated by thyrotomy have been reported by J. Dundas Grant.² Hengesbach⁶⁹ reports a case cured by direct attack and removal of the affected vocal band *in toto*, and cauterization of the stump with the thermo-cautery. George Stoker¹¹ reports 1 successfully treated by endolaryngeal procedures with the electro-caustic snare. Gouguenheim and Mendel²⁷ report a case of epithelioma of the ventricular band cured, without recurrence to date, by endolaryngeal extirpation.

Carcinoma of the Trachea.—Primary carcinoma of the trachea is quite rare. An instance is reported by F. Pick, of Vienna,⁸⁸ who summarizes 15 other cases, which were all he found on record. The case in point occurred in a man 57 years of age, who for some months had suffered from hoarseness, tenderness in the throat, dyspnoea, and haemoptysis. Tracheotomy was performed. Serious haemorrhage followed. Relief was not obtained until a catheter was passed to the bifurcation of the trachea. The patient did well for a few weeks, when suffocative paroxysms ensued, and the patient died suffocated after an attempt to re-introduce the cannula. On post-mortem section a primary medullary carcinoma of the trachea was found, with metastases in the cervical lymphatic glands, the thyroid gland, the lungs, and the superior vena cava. Microscopical examination indicated the mucous glands of the trachea as the starting-point of the morbid growth.

Granulation Nodules on the Upper Tracheal Cartilage.—Landgraf⁴¹ reports an instance in which a man, 30 years of age, drank a great deal of cold beer at a festival. The next morning he was confined to bed with pain in the throat, dyspnoea, and dysphagia. Symptoms ensuing indicative of tumor in the larynx, laryngotomy was performed, but there was no tumor found. The larynx was perfectly healthy, but there was a granulation nodule at the level of the first tracheal ring. This was removed, with great benefit to the patient.

Perichondritis.—A. Koehler⁴ relates a case of tumor beneath the left vocal band in which partial laryngotomy produced perichondritis. Tracheotomy was performed and recovery ensued.

Abscess of the Trachea.—Our corresponding editor, Gouguen-

heim, mentions a fatal case related by Jacobs.¹⁰¹² Mar. 16 A male child 7 years of age had great difficulty in expiration, while inspiration remained easy. Laryngoscopy did not reveal the lesion. The diagnosis of a subglottic tumor was made, and tracheotomy was performed. As soon as the trachea was excised a mass of pus escaped, and the patient died soon after of pneumonia. An abscess of the trachea was found soon after the autopsy. The cesophagus was normal.

ŒDEMA OF THE LARYNX.

M. Hajek⁷⁵⁵ Dec. 11 has been making some anatomical investigations into œdema of the larynx, which largely support the views of Sestier.²¹⁴⁵ The rolling inward of the epiglottis is believed to occur only when the epiglottis has the compressed juvenile form, otherwise the borders of the epiglottis are separated and become flatter. The pharyngo-epiglottic ligament is shoved between the submucous tissue of the lingual surface of the epiglottis and the aryepiglottic folds, so that the intense œdema of the aryepiglottic folds which are due to topical causes, as ulcers, wounds, and the like, is limited, while in the same manner œdema of the lingual face of the epiglottis does not penetrate into the aryepiglottic folds. The pharyngo-epiglottic ligament must be perforated first by special acuity of the inflammatory processes. In œdema of the entrance of the larynx, the passage to the glottis is obstructed most especially by the inflation of the inner layer of the aryepiglottic folds, which lie like two morbid growths upon the ventricular bands, and thus become a great impediment to respiration.

Francis Minot⁹⁹ Dec. 10 reports a case of sudden death, probably from œdema of the glottis, in a healthy lad 17 years of age, with unilateral tonsillitis. Suarez de Mendoza⁷⁸⁵ May reports good results from a few injections of 25 milligrammes ($\frac{2}{3}$ grain) of pilocarpine at intervals of about twenty minutes. Bavachi²³² June 30 reports 3 cases following grippal laryngitis.

FOREIGN BODIES IN THE AIR-PASSAGES.

There is the usual rich record of instances of foreign bodies in the air-passages. Constantin showed to the members of the Société d'Anatomie et de Physiologie²⁴ Feb. 1 a fragment of the vertebral column of a fish which had been lodged in the trachea of an infant 1 year of age. Tracheotomy was performed during a con-

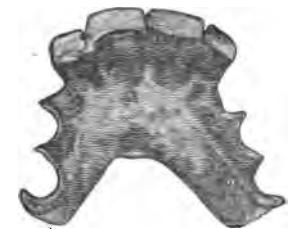
dition of imminent asphyxia, and the next day the foreign body was expelled during a paroxysm of cough. The cannula could not be finally removed for a month. Sérellaz²¹¹ reports a fatal case in which tracheotomy was not performed, under mistaken diagnosis, despite sufficient physical manifestations to have justified its performance. Massei, of Naples, corresponding editor, mentions an interesting case related by de Angelis¹⁰²² of a girl, 13 years of age, who inspired a wooden trumpet, the sound of which was audible on inspiration and expiration at a distance of fifteen metres. No operation was performed. Death occurred on the twenty-third or twenty-fourth day, and the trumpet was found upon the right primitive bronchus, above a pulmonary cavity produced by ulceration of both bronchus and lung.

Lennox Browne¹¹ records an almost incredible instance of unrecognized impaction of artificial teeth in the larynx for twenty-

two months. A lady, some 35 years of age, and reduced by emaciation to 98 pounds in weight, was supposed to be suffering from either cancer or tuberculosis of the larynx. On laryngoscopic inspection, Browne at once recognized a plate of artificial teeth impacted across the larynx and fixed into each hyoid fossa. Under chloroform anaesthesia, to

allay spasm, the foreign body was removed with forceps, aided by digital manipulation. The accident had probably occurred during an epileptic attack some twenty-two months previously, when the patient awoke suddenly with dyspnoea and vomiting, which persisted for thirty-six hours. It was supposed that the teeth had fallen into the matter vomited and been thrown away.

Gouguenheim, of Paris, corresponding editor, calls attention to the case reported by Montaz,⁹⁰⁸ in which a foreign body was retained nine months in the upper portion of the trachea of a lad 13 years of age. It was impacted between folds of membrane, which required dissection to release it. The result was satisfactory, and the cannula was withdrawn. Gouguenheim reports a very interesting case, as yet unedited, from his clinic at Lariboisière. A lady, some 40 years of age, inhaled a small denture into her larynx during an epileptic fit. Tracheotomy was performed, and



CASE OF UNRECOGNIZED IMPACTION OF ARTIFICIAL TEETH.
(*Journal of Laryngology.*)

the foreign body was readily removed with forceps. It was fixed at various points of the laryngeal mucous membrane. The voice did not return after the operation, because of several polyps which became developed at different portions of the larynx in consequence of the irritation caused by the foreign body. Several endolaryngeal operations were requisite, and finally the cannula was withdrawn permanently and the voice became normal.

C. Aubert¹³² performed tracheotomy upon a woman who, in drinking a glass of water, experienced a sudden prick, and had such copious haemoptysis for several days as to render her exsanguine. The leech was so small when swallowed with the water as to be almost invisible; but, when extracted with forceps after the tracheotomy, was found to be half a centimetre in bulk and several centimetres in length. The patient recovered.

Charles C. Ransom, of New York, ⁵⁹ _{Apr. 21} reports the removal with forceps of a large fragment of glass from the larynx after lodgment for twenty-one months. W. R. Burr¹³³ _{June} reports a case in which a youth sucked a collar-button into the trachea. A month later he acquired influenza, with purulent expectoration, intense cough, and much emaciation. On the seventy-ninth day after the accident the foreign body was ejected by cough. John E. Pendleton, of Hartford, Ky., ¹³⁴ _{Sept.} reports 14 cases of foreign bodies in the air-passages. W. C. Glasgow, of St. Louis, ¹ _{Oct. 24} reports an instance of a toy-balloon in the trachea extracted after tracheotomy. F. E. Waxham, ¹³⁵ _{July 22} extracted a pin driven into the epiglottis, head pointed downward into the larynx. It was removed with forceps at the expense of some slight injury to the epiglottis as the point of the pin tore through it. Ch. Périé ¹⁰ _{June}, reports a case of impacted foreign body in the larynx in which, after tracheotomy was performed, it was found impossible to extract the mass,—a fragment of bone. Broncho-pneumonia set in, and lasted a fortnight. Gouguenheim was consulted, and detected a plate of bone occupying the entire length of the subglottic portion of the larynx and parallel to the vocal bands, but he was unable to extract it endolaryngeally. Périé then performed laryngotomy, and extracted the foreign body with some difficulty, owing to its irregular conformation. Haemorrhage was arrested by swabbings with a solution of analgesine (antipyrin) in its own weight of water. The cannula could not be dispensed with for a month later.

An interesting case of tracheotomy is reported by O. A. Fliesburg, of St. Paul.¹⁰⁵ A girl 9 years of age had inhaled a sleeping-doll's glass eye. Tracheotomy was performed, but the foreign body could not be detected. Subsequently, it was found in the larynx, whence it was pushed up and extracted with the fingers through the mouth. Some instructive demonstrations of the complications of tracheotomy are presented in this communication.

WOUNDS AND INJURIES OF THE UPPER AIR-PASSAGES.

Thomas H. Manley, of New York,¹⁰⁶ records a case of cut-throat, illustrating some of the difficulties of tracheotomy in the adult. The patient had deliberately cut his throat with a knife, which was passed horizontally immediately above the upper margin of the larynx, dividing the epiglottis and penetrating to the anterior wall of the oesophagus. Owing to severance of the muscles which connect the hyoid bone with the larynx, there was a wide separation of severed tissues, with collapse of the trachea, making it difficult to expose the trachea and insert a tube. The trachea had to be lifted up out of the thorax, its distance from the integument being nearly three inches, in consequence of extensive infiltrations both above and beneath the deep cervical fascia. Cocaine anaesthesia was produced, and haemorrhage was controlled by compressing all bleeding parts with forceps and pressure-clamps as each layer of tissue was exposed.

A. W. Hornbogen²⁰⁷ reports a case of lacerated wound of the neck, lacerating the trachea, with fatal termination, despite tracheotomy. The patient was a female, 80 years of age, who stabbed herself with a pair of scissors. There was a stellate wound in the neck, and the upper two tracheal rings were broken into numerous fragments, some of which were detached.

A case of recovery after an incised wound of the neck severing the larynx is reported²⁰⁸; a case of recovery from an incised wound of the neck severing the trachea; and a case of recovery from a gunshot wound of the larynx. Geo. L. Morgenthau, of Chicago,⁶¹ reports a case of fracture of the larynx with recovery. Alfred Sokolowski^{4,209} records a case of recovery after severe fracture of the cricoid cartilage. Adolf J. Janowski¹¹ reports a fatal case of fracture of the larynx with laceration of the trachea.

Frank Le Moyne Hupp^{1,210} has reported a case of fracture of

the thyroid cartilage with rupture of the crico-thyroid membrane, terminating in recovery after tracheotomy and wiring of the fragments. J. P. Oliver, of Caldwell,²⁰¹² reports a case of pistol-shot wound of the neck with wound of the œsophagus and larynx. Tracheotomy was performed thirty hours after the injury, and the patient, a male mulatto about 23 years of age, recovered.

Wolff, of Metz,²⁰² reports an instance of habitual luxation of the thyroid cartilage from the cricoid without any annoying symptoms.

STRICTURE OF THE LARYNX AND TRACHEA.

Barrett²⁰³ _{Apr. 15} reports the sequel of a case of stricture of the larynx in a servant-girl, upon whom tracheotomy had been performed by him in 1882 just in time to avert death. She wore her tube in fair health for eight years, when she succumbed to an attack of broncho-pneumonia. Almost total occlusion of the larynx was found below the level of the vocal bands, the stricture being caused by a dense, bony mass surrounding the cartilages of the larynx externally and internally, and almost preventing the movement of the cricoid cartilage upon the thyroid.

In a case of acute laryngeal stenosis, of syphilitic origin, Luc²⁰⁴ _{Mar. Apr.} succeeded in suppressing the dyspnœa without tracheotomy by curetting the tissues. F. Schifflers²⁰⁵ _{Oct. 1} reports a case of stenosis of the trachea and the larynx due to compression by a mediastinal carcinoma. The left vocal band was immobile and the left arytenoid cartilage luxated forward. The diagnosis had been made by exclusion, and was verified at the autopsy.

TRACHEOTOMY.

This subject has been illustrated to some extent in our report on "Foreign Bodies, Wounds, and Morbid Growths of the Larynx." We refer, in addition, to 2 cases of tracheotomy, with unusually difficult after-treatment, reported by A. Jefferis Turner.²⁰⁷ _{May} A male infant, 10 months of age, was tracheotomized for supposed croup. There was prolonged inadequacy of the glottis, and the cannula could not be permanently removed until the ninety-fifth day. A female child, 4 years of age, was tracheotomized for diphtheria. There was secondary obstruction from tracheal granulations, which were cauterized. The tube could not

be removed until the thirty-seventh day. Pneumonia followed, but the child finally recovered.

The stenosis of the trachea and larynx which occasionally follows the use of a tracheotomy-tube is illustrated by Bernard Pitts and William F. Brook, ^{10,11} in the narration of 4 cases in which the obstacle was some form of definite mechanical occlusion of the upper part of the trachea or of the lower laryngeal aperture. They very properly lay stress upon the fact that tracheotomy is usually performed too high up in children, and that the cricoid cartilage is often divided. Thus, unless the tube happens to suit the particular case exactly, a good deal of irritation of the back of the trachea, or even of the lower laryngeal aperture, is apt to be occasioned by the angle of the tube. Fromaget, ¹⁸⁸ reports an instance of abscess of the mediastinum, consecutive to tracheotomy, with sudden death. The patient was a child with croup. A sac of pus enveloped the pneumogastric nerve.

Maurice Soupault ¹¹⁸ recommends creasote as a preventive of broncho-pneumonia after tracheotomy.

J. C. H. Dickinson ^{9,10} reports a tracheotomy in a case of poisoning with ammonia. The patient was a publican, 32 years of age, frequently a subject of delirium tremens, and had swallowed an ammonia liniment. He recovered satisfactorily.

Eugène Révilliod ¹⁹⁷ reports a case of polyp of the trachea, consecutive to tracheotomy for croup, in an infant 2½ years of age. A second tracheotomy was performed, and the tumor was removed with a curette. The patient recovered. Muselier ⁵⁵ reports a case of hysteria, with laryngeal spasm and asphyxia, in which tracheotomy was performed.

Delthil ²⁴ discusses the auto-inoculation consecutive to tracheotomy. He attributes rapid death to transformation of a simple croup into a toxic croup by auto-inoculation.

Profuse haemorrhage after tracheotomy is the subject of an article by Ad. Maas, of Berlin, ³⁰¹ who appears to have encountered quite a series of instances of the unusual complication. He cites 18 cases in all. In 7 the haemorrhage came from large corroded blood-vessels in the neighborhood of the tracheal wound. In 11 the bleeding appeared to be of pulmonary origin, as no wounded vessels could be observed. The latter class of cases is not so fatal as the former. The effects of atmospheric pressure

on the trachea after tracheotomy have been studied by Girod ²⁹⁰ _{Dec. 22, '90} on the human cadaver and on living animals. He finds that section of several rings produces a tendency to collapse, the sides of the severed incision being forced together, while suffocative paroxysms may take place even after the external wound has healed, in consequence of the union of the tracheal cartilages by cicatricial tissue. An extensive experience in tracheotomy in the living human subject does not justify, in my opinion, this belief in suffocative paroxysms after healing of the external wound.

Tracheotomy was performed by O. A. Fliesburg, of St. Paul, ¹⁰⁵ _{Sept. 11} in a lady 69 years of age, with right-sided carcinoma of the larynx. The operation was difficult on account of paroxysms of dyspnœa, bordering on apnœa. I think the doctor is to be congratulated in performing this operation without an anæsthetic, a plan always desirable when the air-passage is much occluded. The patient left on the twentieth day, and, at the time of report, ten months later, her bodily condition had continued to be of the very best. Our corresponding editor, Massei, calls our attention to the fact that a young surgeon in Spolito, Bocchini, ⁵⁸⁹ _{Oct. 11} has performed 20 tracheotomies for croup, with 70 per cent. of recoveries, and that he prefers the Paquelin cautery.

THYROTOMY.

Successful thyrotomies for carcinoma of the larynx have been reported by Dundas Grant ¹² _{May} and David Newman ²¹³ _{June}; an unsuccessful case by Moure. ⁸ _{Apr. 2; Nov. 1} ¹³⁶ Clinton Wagner, of New York, ¹ _{Nov. 7} reports a case of thyrotomy for morbid growths in the larynx of a child 18 months old, who had been supposed to be suffering from asthma. This is stated to be the youngest subject of this operation on record.

LARYNGECTOMY.

Laryngectomy continues in favor as a radical operation for malignant diseases of the larynx. Complete laryngectomies successfully accomplished, with favorable results up to dates of report, have been recorded by Willy Meyer ¹ _{Feb. 7, '91} and Root ¹ _{Oct. 17}; successful partial laryngectomies by Toti. ¹³⁶ _{Oct. 15} Trendelenburg ⁶⁹ _{Oct. 1} exhibited before the South Rhine Society of Bonn a woman whose larynx he had removed for carcinoma, July 3, 1890. She now had some

slight bleeding from the cannula, due to granulations, but was doing remarkably well, and spoke with a husky whisper, audible at several feet distance. He likewise exhibited the recent photograph of a man, 32 years of age, from whom some three years previously he had removed half the larynx for supposed carcinoma, which turned out to be tuberculosis. The patient has remained cured for more than three years, and speaks with a loud voice. Unsuccessful partial laryngectomies for epithelioma have been reported by Guermonprez.²²⁰ Poulsen²³⁰ reports an extirpation of the larynx and a portion of the pharynx, and formation of a new gullet with skin-flaps. Death ensued by pneumonia seven weeks after the primary operation. Thomas F. Chavasse, of Birmingham,⁶ relates a successful case of unilateral laryngectomy in a boy 3 years of age for cicatricial stenosis.

SPASM OF THE LARYNX.

A case of hysterical spasm of the larynx, in which tracheotomy became requisite, by Muselier,¹⁰⁰ is brought to our notice by Gouguenheim, corresponding editor. A young woman, 23 years of age, was twice subjected to tracheotomy for violent spasm of the larynx, with asphyxia.

Kurt showed, at the "Doctoren-Kollegium" of Vienna,²² a 6-year-old female, long afflicted with chronic tonic spasm of the larynx, as a sequel of whooping-cough, and cured by mechanical irritation of the conjunctiva and of the nasal mucous membrane. His theory is, that excitement of quiescent branches of a nerve will control reflex contraction in other branches. He titillates the nasal mucous membrane with a feather dipped in a mixture of quinine and sugar.

J. H. Bryan, of Washington,⁶ reports a case of laryngismus due to a congenital valvular formation of the upper orifice of the larynx. The child had been subject to tonic spasm of the larynx since it was 2 weeks of age. The epiglottis was found to be irregular in outline, and bent backward over the laryngeal cavity. The spasm was attributed to a binding of the epiglottis, causing the aryepiglottic folds to come almost in apposition, so that there was a slight stridor produced during inspiration. The child had phimosis, and was being fed on undiluted cows' milk. On diluting the milk and relieving the phimosis by gradual dilatation,

the respirations gradually lost their spasmodic character and became normal.

Under the name inhibitory laryngismus, Ricardo Botey ⁹⁹⁶_{Sept.} records 3 cases of the malady usually termed laryngeal vertigo (Charcot), or laryngeal ictus (Garel). The most remarkable feature in these cases is in the youthfulness of the patients,—31, 29, and 15 years of age, respectively; all males, as is usually the case,—for in the great majority of cases the patient is much farther advanced in life. In the first case terrible paroxysms occurred, suddenly and without premonition, day and night, sometimes with losses of consciousness of one or two minutes in duration. The second patient had tuberculosis of both apices, with laryngismus and dysphagia. The right lower turbinate was hypertrophied, as also the lymphoid nodules in the base of the tongue. Electrocauterization of these structures cured the spasms. The third patient had very serious attacks of laryngismus, with losses of consciousness, sometimes accompanied by epileptiform convulsions, sometimes by convulsive cough. There was atrophy of the nasal mucous membrane, and hypertrophy of the tonsils and of the lymphoid masses in the vault of the pharynx. Treatment of these conditions cured the case. [The evidence of spasm of reflex origin is too obvious in the last 2 cases to need further comment.—ED.]

PARALYSES OF THE LARYNX.

In a tabetic man, 37 years of age, affected with complete bilateral paralysis of the posterior crico-arytenoid muscles, Ruault ³⁷_{July} induced Ch. Monod to exsect a centimetre and a half of the left recurrent nerve below the inferior thyroid artery, but the expected cadaveric position of the vocal bands did not follow the operation. It is intimated that the muscles must have had additional innervation from the superior laryngeal nerve.

W. Robertson, of Newcastle-on-Tyne, ¹¹_{Oct.} reports 2 cases of posicus paralysis in infants. Masini ⁵⁸⁹_{Mar. 24} describes a case of hystero-traumatic paralysis of the arytenoid muscle.

Lennox Browne, of London ²²_{Dec. 17, '90} reports an instance of persistently fixed vocal band in the middle line after an attack of hemiplegia. A male clerk, 42 years of age, had been quite well until within some twenty-one months, when, after walking, on a cold, wet day, he experienced a sensation of intense cold along the right

side of his face and neck, with loss of tactile sensation, but not of the sense of temperature. Four weeks later paresis had become developed on the right shoulder, arm, and side of the body. On admission, the voice was broken, hoarse, and polyphonic, and on laryngoscopical inspection the vocal band of the right side was seen, immovably fixed, almost in the median line (see cut), with distortion of the aryepiglottic fold and the arytenoid cartilage, so that they appeared as though swollen.

Nervous Cough.—Paul Raugé¹⁴ _{Sept. 15, 16} believes that nervous cough is associated with a particular condition of the cerebral functions. It is not necessary to conclude that all patients are hysterical or that they are simulating disease, but they are all neuro-

pathic subjects, in whom the cough is but one of the multiform manifestations of the original nervous condition.

Peripheral Neuritis of Laryngeal Nerves.—Procter S. Hutchinson, of London, ² _{July 16} is inclined, from some cases in his own experience, to recognize the existence of a peripheral neuritis of the motor laryngeal nerves, and due to exposure to cold and to rheumatism. Five cases narrated present the same features

CASE OF PERSISTENT IMMOBILITY OF
RIGHT VOCAL CORD AFTER HEMIPLA-
GIA.
(*Medical Press and Circular.*)

of rapid onset, of complete paralysis of one vocal band, of absence of pain, and failure of the condition to recover itself after several months.

Pemphigus of the Larynx.—Landgraf¹⁴ _{Jan.} reports a case in connection with chronic diffuse involvement of the conjunctiva and of the mucous membrane of the nose, pharynx, larynx, trachea, and mouth. Arthur Irsai⁵⁷ _{July 12, 19} reports a case of pemphigus of the upper air-passages, and summarizes the other cases on record.

Acute Arthritis of the Crico-Arytenoid Articulation.—Lacarret, of Salies-de-Béarn, read a communication on this subject to the French Society of Otologie and Laryngology.¹³⁸ _{June 1, 16} Rheumatism from cold is believed to be more frequent than is generally supposed, and a great many cases recorded as acute œdema of the



larynx enter into that category. Arthritis by propagation is the most frequent variety, but traumatic and blennorrhagic arthritis likewise occur.

ŒSOPHAGUS.

Malformation of the Œsophagus.—Our corresponding editor, Gouguenheim, calls attention to a congenital tracheo-œsophageal fistula reported by Grandou.⁷ A newborn infant vomited all its ingesta, and the œsophageal-sound could not be passed. At the autopsy there was found an imperforation of the œsophagus at its superior portion below the thyroid cartilage. Thence it continued as a cord, without communication with the superior portion of the gullet, but an injection practiced from below upward revealed a communication between the œsophagus and the trachea.

C. Gerhardt⁵⁵ _{Sept. 12} states that, when a sound is introduced into the trachea of a normal individual as far as the neighborhood of the bifurcation, and the sound is then attached to an India-rubber tube, the other end of which is immersed in water, it will be observed that forcible pressure upon the sound produces expulsion of some bubbles of air. If, however, the pressure be continued, fresh bubbles are not produced,—contrary to what is observed when a fistula exists between the trachea and the œsophagus,—in which case there is a continuous escape of air by the rubber tube. During the obstruction of the glottis the subject of a fistula continues to respire tranquilly by way of his œsophagus, while the normal subject cannot expel by the sound more than a minute proportion of the air contained in his air-passages.

Esophagitis.—Reichmann⁶⁰ _{Nov. 12, '90} describes a case of exfoliative œsophagitis. A man 33 years old, otherwise healthy, who had from time to time had attacks of dysphagia, was suddenly seized with an absolute closure of the œsophagus. On the fifth day a thick, membranous formation was expelled, as a result of violent efforts to vomit, but the expulsion of this mass did not facilitate deglutition. On the following day an œsophageal bougie was introduced with considerable difficulty, and the passage was made free. After some days the patient passed per rectum a membrane which resembled the one previously vomited. The microscopical appearances of the vomited membrane, of which some pieces were fifteen centimetres long, three centimetres broad, and one-eighth of a millimetre thick, showed that it was composed exclusively of

many layers of pavement epithelium, like that found in the œsophagus. The writer thinks that this case proves that in the œsophagus, as in the vagina and urethra, catarrhal inflammations occur which may cause the closure of the lumen of the canal by the formation of a firm lining of epithelium. A similar case has been observed by Birch-Hirschfeld, and described by him as pseudo-croupous inflammation.

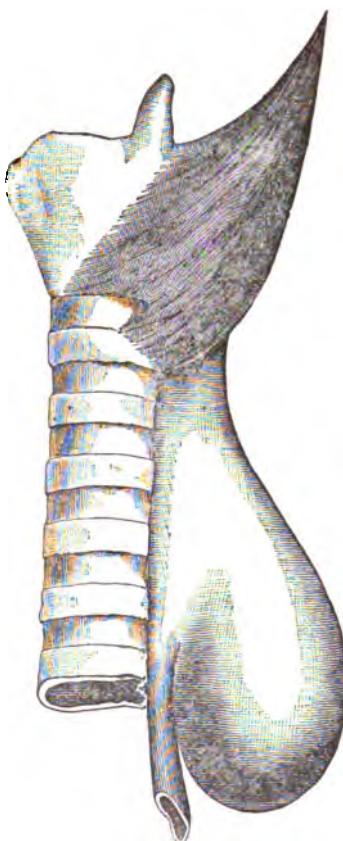
Diverticulum of the Œsophagus.—T. F. Chavasse² showed a specimen to the Pathological Society of London, removed from the body of an emaciated man, 49 years of age, upon whom gastrostomy had been performed for a dysphagia of ten years' standing. Death had taken place from pneumonia and exhaustion two days after the operation. The post-mortem examination revealed a posterior diverticulum four inches in depth from the level of the arytenoid cartilages, three and one-half inches in breadth, and two and one-half inches in thickness, with a mouth one inch in diameter and a capacity of 6 ounces (186 grammes). The walls of the sac were as thick as those of the œsophagus, and lined throughout with mucous membrane. When filled with fluid the opening in the œsophagus was firmly closed by the pressure of the distended sac. There was no malignant growth present. It was pointed out that the absence of muscular tissue, except at the mouth of the sac, supported the contention of Zenker and von Ziemssen, that these posterior diverticula were primarily due to the effects of pressure and to a congenital defect, as held by some authorities.

Walter Whitehead³ reports an instance of diverticulum of the œsophagus causing obstruction in which gastrostomy was performed, the patient surviving six years. A married woman began to have difficulty in swallowing in her 49th year. This had increased to almost inability to swallow eight years later, when, November 13, 1882, she came under Whitehead's care. Gastrostomy was performed four days later, with rapid and complete convalescence. After feeding by the fistula for two years and acquiring robust health, she commenced by degrees to feed again from her mouth. For several months she swallowed well, and then the old trouble gradually recurred. She gradually became exhausted, and died, January 1888, without recurrence of complete obstruction of the œsophagus. On examination of the

œsophagus, a large pouch was discovered, fully three inches in length and two inches in breadth (see illustration) and half full of partly digested food.

Dilatation of the Œsophagus.—Rumpel⁶⁹, exhibited a specimen of primary diffuse dilatation of the œsophagus from the body of a showman 53 years of age. Commencing at the cricoid cartilage, the œsophagus was uniformly enlarged in all directions into a spindle-formed organ, whose greatest diameter, eleven centimetres, was attained at the level of the bifurcation of the trachea. From thence it uniformly diminished in calibre to a point four centimetres above the cardia. There was no cicatrix or other ulceration at the cardia, either in the œsophagus itself or in its immediate vicinity. The entire length of the œsophagus from the interarytenoid incisure was thirty-nine centimetres. The musculature of the œsophagus showed no change under microscopical examination. For the last eleven years of the patient's life his disease appeared to be a stricture of the œsophagus with secondary dilatation. During the last six weeks of his life he had to be nourished with the œsophageal catheter, which sometimes slid into the stomach easily and sometimes only with great difficulty. It is worthy of remark that, in these cases, despite the enlarged dimensions

of the dilated œsophagus, there is an entire closure from the stomach by a sort of valvular action when the œsophagus was filled with fluid. Thus, when the stomach is filled, the œsophagus can be washed out with a given amount of fluid, which will be returned without mixture of the contents of the stomach. Rumpel believes that the increased length of the œsophagus may be produced by this mechanism.



DIVERTICULUM OF ŒSOPHAGUS.
(*London Lancet.*)

Otto Leichtenstern ⁶⁹ _{Apr. 2, 1881} reports an enormous sacciform dilatation of the œsophagus, without mechanical stenosis, in a case of hysterical vomiting of seven years' duration. A girl, 19 years of age, had had incoercible hyperemesis for seven years, attributed to hysteria. She vomited all her food, and the masses vomited usually had no acid reaction, and thus were supposed to come from the œsophagus and not from the stomach. Post-mortem examination showed an enormous dilatation of the thoracic portion of the œsophagus into a loose sac, which penetrated both pleural cavities and suddenly ceased at the œsophageal foramen. The cardiac orifice was spasmically contracted. The muscular coat of the œsophagus was greatly hypertrophied, and there was no other pathological change.

Foreign Bodies in œsophagus.—In exemplification of the severe and irreparable injury sometimes done in violent efforts to remove foreign bodies from the œsophagus, Baratoux ²⁸⁰ _{Jan. 12} narrates a case in which an artificial denture was pushed in toward the stomach after a number of ineffectual efforts to withdraw it. There was great haemorrhage, and the patient died from exhaustion a few days afterward. At the autopsy a small portion of the denture containing a tooth was found in the intestinal canal, at the junction of the transverse and descending colon. The other portion was found in the œsophagus, eight centimetres above the cardia, and above it was an enormous laceration of the œsophagus of not less than six centimetres. This laceration penetrated into the posterior mediastinum, which contained pus and alimentary substances. From this pocket the finger easily entered the left pleura, which contained about a litre (1 quart) of liquids of the same character. As much was also found in the right pleura. In addition, there was a laceration of the œsophagus in the vicinity of the cardia, and an almost complete severance of the epiglottis. The stomach and entire intestinal tract were filled with blood, more or less altered.

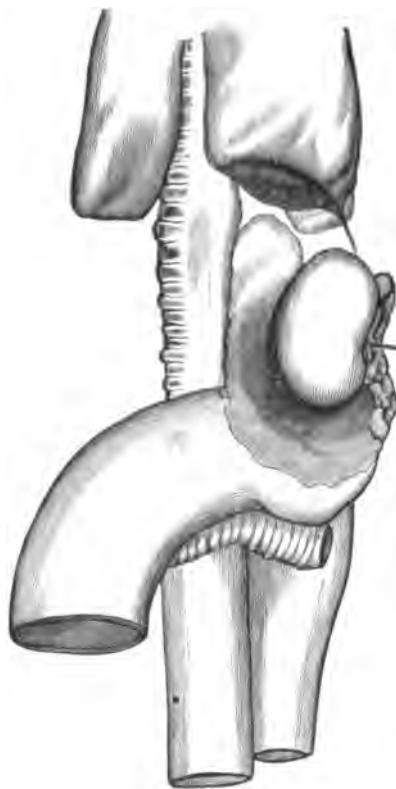
Buttenberg ⁶⁸ _{Sept.} reports a case in which an irregular piece of porcelain from a cup had remained unnoticed for a considerable time in the œsophagus of an insane patient, from the effects of which he had died. The anterior mediastinum was found completely purulent. There was a fetid secretion in the right pleural sac. The foreign body had perforated the walls of the œsophagus in three places. Richard S. Hill, of Washington, D. C., ⁸¹ _{July} reports an in-

stance of a needle, swallowed but four hours previously, removed from the right side of the thorax, just above the fifth costal cartilage, at which point a small protuberance had been noted, caused by the head of the needle, which had not yet penetrated the skin. [This is probably the most rapid case of transit on record.] S. L. Abbott,²⁹ records an instance in which an arrested portion of lettuce formed a temporary obstruction by its valve-like position in the tube.

B. Polikier, of Warsaw,¹¹⁸ gives a very simple method that may have its uses for the extraction of foreign bodies in the *œsophagus*. He had been asked to see a child of 5 years, who had swallowed a piece of money about the size of a five-cent nickel piece. Not being able to find anything by the internal examination of the throat, he tried to see what he could do by an external method. Placing his finger in the space between the trachea and the sterno-cleido-mastoid muscle on the left side, he made an effort by pushing upward. While remaining in this space, by careful touch, he was able to find an elevation a little below the cricoid cartilage, which was no doubt the foreign body. While with one hand he tickled the child's throat, he made a sort of massage by pushing against the body upward and backward, when in a few seconds the child vomited the coin. The second case was one in which the child had swallowed a silver piece (about the size of a quarter-dollar), and the same manipulation succeeded in making the child vomit the piece. The conclusions that can be drawn from these 2 cases is that, notwithstanding the deep position of the *œsophagus*, it is possible to find a foreign body, in some cases, by external manipulation, and the simplicity of the method is worth a trial, rather than the usual efforts tending to push the body downward.

Dagron⁷ reports a unique instance of death by purulent infection from perforation of the *œsophagus* with a pin. The patient, a man 42 years of age, had experienced a severe pain low down in the neck, while swallowing, some six weeks before he came under the care of Le Dentu. Five days before admission he had a severe chill, followed by profuse sweating and delirium. The left subclavicular region was swollen, red, and tender on pressure, with fluctuation two fingers' breadth above the clavicle and beyond the sterno-mastoid muscle. Only a few drops of pus exuded on incising

the abscess. A second incision, a few days later, with very little pus. Adynamia, coma, and death on the evening of the fifth day after admission. At the autopsy a ganglion the size of a nut, elongated, was found applied vertically against the œsophagus and trachea and traversed by a delicate, black, steel pin. (See cut.)



PERFORATION OF ŒSOPHAGUS BY A PIN.
(*Bulletin de la Société Anatomique*.)

been noticed when the child was 2 months old. Five years previously the patient had suffered with whooping-cough, since which it had increased considerably in size. It was the size of a nut, round, distinctly circumscribed, painless, and fluctuating. The skin over it was freely movable. It became elevated with the trachea on swallowing. It gave a dull percussion sound with tympanic adjunct. During cough the tone was distinctly tympanic. After the operation healing took place by first intention, and the cough ceased entirely. Microscopical examination showed that the tumor was a cyst lined with cylindrical epithelium. Its outer

Myxoma of the Œsophagus.—

W. Cheatham, of Louisville,²²⁴ reports a case of recurrent mucous polyp of the œsophagus which he removed in a very ingenious manner. One-sixth of a grain (0.011 gramme) of apomorphia was administered hypodermatically. It acted promptly, throwing the growth into the mouth, when it was caught with a vulsellum, and was then surrounded with a wire snare and cut off close to its base with but little difficulty. It was one inch in diameter, five inches in length, and almost cylindrical.

Tracheocele.—Baracz⁵²⁰ reports a median tracheocele in a girl 8 years of age, with a tumor in the neck, who had suffered for several weeks with severe paroxysms of cough, during which the tumor enlarged. The tumor had

wall was composed of connective tissue, with traces of smooth muscular fibres. The cyst contained viscid mucus and air. Baracz attributes its development to a congenital, incomplete internal fistula of the neck, through which a hernia of the trachea was produced apparently after the attack of whooping-cough.

Lymphomatous Tumor of the Œsophagus and Trachea.—J. Cahill ² exhibited to the Pathological Society of London a specimen, taken from a woman 49 years of age, which consisted of larynx, trachea, and bronchi, with the upper two-thirds of the œsophagus. Immediately below the level of the cricoid was a tumor about two inches in length, embracing the œsophagus and the sides of the trachea. The growth penetrated the œsophagus, in which it formed a fungous constriction of the calibre of a No. 6 catheter. It penetrated the trachea posteriorly and at the sides. There was another and larger tumor immediately below the bifurcation of the trachea, adherent to the bronchi and pulmonary vessels, partially caseous and apparently lymphomatous. The lungs contained numerous small tubercles; the other viscera were healthy. The lymphatic glands in other parts of body were not enlarged. The patient suffered from increasing dysphagia and dyspnoea for six months before death. Paralysis of the right vocal cord appeared four months before death; both vocal cords were affected two months later. From its invasion of the œsophagus and trachea, the cervical growth was thought at first to be probably carcinomatous in character. On microscopical examination, however, it appeared to be of a lymphomatous nature, and analogous to the glandular mass in the posterior mediastinum. If the tumor from the neck was simply due to tubercular infection of lymphatic glands, its effect in perforating the trachea and œsophagus and causing stricture of the latter organ was certainly unusual.

Carcinoma of Œsophagus.—Our corresponding editor, Gouguenheim, in discussing the operation of gastrostomy for cancer of the œsophagus, as practiced by F. Cerrier and Louis, ⁹¹ states that this operation in one sitting, after the method of Cerrier, is well tolerated by the patient, and heals rapidly enough if the opening into the stomach is small and near the pylorus, and no obturator is introduced into the fistula. Nevertheless, its results have not been happy, for 5 patients have succumbed rapidly. This operation, highly perfected as to its manual technique, has not

given the results which should be expected from it in the treatment of cancer of the oesophagus.

Hugh Montgomery¹¹ reports a case diagnosed with the laryngoscope, which, two days after the examination, terminated fatally by syncope while the patient was sitting up to take nourishment. She was a married lady, 40 years of age, who had lost relatives with cancer and with phthisis. An almost painless swelling the size of a walnut had made its appearance, some four months previously, behind the left side of the thyroid cartilage. Softening ensued, abscess, discharge of contents, and fistula. On laryngoscopy the larynx was marked at first by a cauliflower mass which seemed to spring from it, but which was found to spring from the oesophagus and to override the arytenoid cartilage. The larynx was red, the left ventricular band swollen, and the left vocal band red and fixed in the position of adduction.

Martin-Durr^{7,14} reports and illustrates a case with perforation into the left bronchus and secondary carcinoma in the abdominal muscles. Christovitch, of Salonica,⁶⁷ reports a case of cancer of the oesophagus and larynx treated by external oesophagotomy and tracheotomy. The patient was discharged, much improved, in a month, wearing his cannula, but able to swallow by the mouth with very little difficulty.

G. Hunter Mackenzie, of Edinburgh,¹¹ reports a rapidly fatal case of malignant disease of the oesophagus, with perforation of the trachea and bronchus, in a commercial traveler 44 years of age, in whom slight dyspnoea and dysphagia was first noted on Christmas, 1887, and who died on May 9th following. At an inspection of the gullet and windpipe made the following day, a chain of hard masses, each being rather larger than a bean, with several smaller masses interspersed, was found along the left side of the trachea from the inferior border of the corresponding lobe of the thyroid gland. These extended beyond the bifurcation, but apparently did not press on the trachea or bronchus. On the right side there were similar masses, but twice as large, extending downward in a similar way, and pressing slightly upon the right bronchus. The thyroid lobes were enlarged, but were not diseased. On laying open the gullet, there was found on the posterior wall, corresponding to the lower third of the trachea, an ulcer about two and a quarter inches long, with several honey-comb openings,

the largest of which might be covered by a threepenny coin, leading into the deeper peri-oesophageal tissues. On the anterior wall was a corresponding ulcer, leading by a conical opening into a pit, at the bottom of which was an opening into the left bronchus, large enough to admit a grain of rice. For an inch and a half upward the gullet was thoroughly healthy, then another ulceration was reached, extending upward for about four inches, with a breadth of about three-quarters of an inch. The tracheal cartilages were there entirely eroded, and free communication existed between the food- and air- passages. The recurrent laryngeal nerves were pressed upon by the above-described masses. This pressure was most marked on the right side. Microscopical examination indicated carcinoma.

David Newman, of Glasgow,²¹³ reports a case of epithelioma of the upper portion of the oesophagus successfully treated by gastrostomy and tracheotomy. A case of multiple epithelioma of the oesophagus and stomach has been reported by G. G. Campbell.²⁸² Two epitheliomata were found high up in the oesophagus, and another was found in the stomach close to the oesophageal opening. It was difficult to say which was the primary tumor.

Sarcoma.—Lauriston Shaw, of London,² has reported 2 cases of malignant disease of the oesophagus, the first of which was a sarcoma, which appeared as an ulcer with well-defined margins, which had destroyed an extensive area of the mucous membrane of the gullet, and had perforated the posterior wall of the trachea just above its bifurcation. There were secondary deposits in the neighboring mediastinal lymphatic glands, and other deposits were found in the lungs and in the kidneys. The patient was a female, 38 years of age, who had suffered from dysphagia for six months, and had died from exhaustion. The second specimen was an ordinary epithelioma, which had produced obstruction by protrusion into the lumen of the gullet.

Stephan³⁶⁶ reports a lymphosarcoma of the oesophagus in a 4-year-old boy. There had been dysphagia, pain in swallowing, and vomiting, especially after the use of semi-solid or solid food. As nutrition failed there occurred great anaemia, slight oedema under the eyelids, and very marked evidences of stasis in the vascular region of the throat and head. The temporal, radial, and crural arteries pulsated strongly and visibly, the left half of the

thorax being abnormally prominent in the region of the heart. The patient died under increasing œdemas and repeated paroxysms of dyspnoea. The section revealed a lymphosarcoma, sixteen millimetres long and ten millimetres thick, directly above the cardia, which was not agglutinated with the surrounding tissues. The lumen of the œsophagus in the domain of the tumor was permeable for a moderately-sized catheter. It was not dilated above the tumor.

Rupture of the Œsophagus.—Morley¹⁰⁵ exhibited a ruptured œsophagus from a German, 38 years of age, who, on jumping from his wagon, had been immediately seized with pain in the stomach, nausea, and the vomiting of a great deal of blood and a full meal which he had recently taken. He was a heavy drinker, and had had several attacks of chronic gastritis. He had another haemorrhage that day and one or two the next day, dying the night of the second day. At the autopsy a linear rupture of the œsophagus was found at its junction with the stomach. The peculiarity was, that a rupture of the pleural cavity occurred secondarily.

Stricture of the Œsophagus.—A case of congenital stricture has been reported by George W. Crary.¹⁰⁶ The patient was a male 21 years of age, whose dysphagia dated from his birth. Exacerbations occurred at 12 years of age, with inability to swallow even water. The stricture was found to be a long one, situated fourteen to sixteen inches from the teeth, diminishing in calibre as it approached the orifice of the stomach, near which opening it was evidently located. It had been satisfactorily treated by gradual dilatation. A case of stricture of the œsophagus from interstitial thickening of its walls is reported and illustrated by John O. Roe, of Rochester, N. Y.¹⁰⁷ A lady, 58 years of age, with difficult glutition of three months' standing, who had been treated by dilatation with bougies with temporary benefit, and had been nourished subsequently with enemata, was found by Roe to have a cylindrical stricture about two inches in length and beginning about two inches from the mouth of the œsophagus. Dilatation and subsequent nourishment through the catheter failed to avert death by asthenia. On dissecting the stricture, the posterior wall was found three times its normal thickness at its most constricted portion, the muscular fibrilla having become



STRICTURE OF THE ŒSOPHAGUS.
(*New York Medical Journal.*)

degenerated and replaced by a connective-tissue formation far in excess. The thyroid gland was enlarged by chronic interstitial thickening of the connective tissue, similar to the condition found in the œsophagus.

Arch Dixon, of Henderson, Ky.,¹ reports a case of impermeable stricture of the cardiac end of the œsophagus, in which gastrostomy was successfully performed, and was followed subsequently by retrogradic dilatation through the stomach.

In some further observations on permanent tubage of the œsophagus, by J. Mixter, of Boston,² some cases are related showing the tolerance of the tube and the comparative comfort of the patient, which is claimed to be greater than that afforded by gastrotomy. Mixter has made some improvements in the appliances for passing the stricture and introducing the funnel-shaped tubes.

Spasm of the Œsophagus.—P. Haushalter, of Nancy,³ reports a case of hysterical œsophagism and dysphagia in a girl 12 years of age. It appeared apparently, suddenly, as the first manifestation of hysteria under the influence of a moral emotion, in a conflict with a boy who had mocked at her while she was bathing in a river. She returned home, pale, crying, and very angry. At the ensuing meal she was unable to swallow, and from that day rejected everything she ate, except raw carrots and green fruits. A cure was effected under psychical influence. The physician announced that he would cure her at a certain hour. At that hour he placed her in a suspension apparatus, raised her from the ground for a few minutes, then let her down, and announced her as cured. She then ate a dinner,—soup, vegetables, meat, bread and wine,—which had been brought in during the suspension. She recovered her spirits, strength, and good looks, which had become much impaired during the six months' duration of the œsophagism.

Œsophagotomy.—Novaro²⁷⁶ quite recently performed a combined pharyngo-œsophagotomy and thyroidectomy for a pharyngooœsophageal carcinoma. Notwithstanding recurrence, the patient was doing well four months after the operation.

Thomas H. Morse² reports a successful case for removal of an irregular fragment of bone of a fowl. Ch. Roersch²⁹⁸ describes 2 cases of external œsophagotomy for foreign body performed by von Winiwarter. One was a man 61 years of age, who had swallowed a false denture, and who had been subjected to ineffectual attempts at its extraction by the mouth. It was a very unfavorable case. His condition became worse after operation, and

he died the next day, probably from the effects of laceration of the tissues in attempts at extraction. The other was a girl 5 years of age, who had swallowed a metallic cuff-button. Recovery was complete on the fifteenth day. The œsophagus had been affixed to the cutaneous wound with two sutures, and then opened with the thermo-cautery.

Willoughby Furner⁶ reports a successful case of œsophagotomy for removal of a tooth-plate impacted in the œsophagus for five years and nine months.

Woods² reports a case for removal of a stone weighing 620 grains (39 grammes) from a maniacal man 22 years of age, who died from exhaustion on the seventh day. Sixteen stones, some twigs, grass, and leaves were found in various portions of the intestinal canal.

NEW INSTRUMENTS.

An ingenious device has been adopted by Ferdinand Suarez de Mendoza, of Algiers,³⁷ for the purpose of retaining sight of a laryngeal morbid growth during attempts to remove it with antero-posterior forceps. It consists (see cut) of a pair of antero-posterior



MENDOZA'S LARYNGEAL FORCEPS.
(*Annales des Maladies de l'Oreille, etc.*)

forceps, the blades of which are largely fenestrated to permit vision through them during their manipulation. Several cases are recited in which these forceps fulfilled the indications for which they were constructed.

G. Masini⁵⁰ has had a laryngeal syringe constructed for administering injections into the trachea, and to which our attention has

been directed by our corresponding editor, Massei, of Naples. It terminates in a catheter, which can be lengthened or shortened, and can be turned in any direction like a laryngeal brush.

INTUBATION OF THE LARYNX.

BY J. O'DWYER, M.D.,
NEW YORK.

THE contributions to the literature of intubation that have appeared in Europe during the year, while quite voluminous, are, with a few notable exceptions, of little value, because only a small percentage of those who have written on the subject have had a sufficient number of cases on which to base any definite conclusions. On the other hand, the number of operators in this country who can count their cases by hundreds is now very considerable, and it is to these and to the few on the other side, who have had in the neighborhood of 100 or more cases, that the honest seeker after truth must look for facts in regard to the value of this procedure. The accumulation of such a number of cases by one operator requires a considerable period of time, and is therefore very likely to include different types of the disease, which has such an important bearing on the result. It is also a guarantee that the ability to intubate safely has been acquired, together with the knowledge necessary for the proper management of the cases after operation. Johann Bókai, in a paper read before the Society of German Physicians and Naturalists,⁵⁵⁹ gives his experience with intubation and tracheotomy as practiced at the Stefanie Children's Hospital, Buda-Pesth, Hungary. Bókai, in his early experience with the operation, intubated and tracheotomized alternately, excluding from both operations septic cases of diphtheria and those in which the croupous process had extended into the smaller bronchi. Since January 1, 1891, he has practiced intubation as a primary operation exclusively, and has had 109 cases with 37 recoveries, or 34 per cent. Among the 109 cases were 78 in which the croup appeared subsequent to pharyngeal diphtheria, and of these 24, or 30 per cent., recovered. Of the same class of cases in the two previous years he had saved only 14 per cent. by means of tracheotomy. In 31 of the cases there was no pharyn-

geal diphtheria, and 10 of these, or 41 per cent., recovered, the youngest child that recovered being 10 months old. In the same class of cases, during the two preceding years, tracheotomy had yielded 39 per cent. of recoveries. Bókai left the string attached in all cases, and removed the tube every twenty-four to forty-eight hours, re-inserting it only on the recurrence of severe dyspnoea. He found no great difficulty in feeding his intubated patients. In 72 autopsies superficial ulceration was found in 18, deep ulceration in only 3. Secondary tracheotomy was performed 3 times without success. The frequent removal of the tube, as practiced by Bókai, I believe to be objectionable, unless specially indicated, because of the increased irritation to which the larynx is subjected, especially if the extractor has to be used. There is no doubt about the advantage of leaving the string attached when this can be done without annoying the patient too much.

Rauchfuss, of St. Petersburg,²⁰¹⁶ reports 35 intubations with 30 per cent. recoveries, and, with a candor worthy of emulation, states that in 3 cases the tube perforated the larynx and could be felt under the skin. In other words, a false passage, beginning in one of the ventricles, the usual starting-point, was made in 3 out of 35 cases, which, I believe, is not a large percentage of this accident for beginners. Only those possessing an extraordinary amount of natural dexterity can learn to intubate safely, with the experience derived from this number of cases, unless supplemented by a large amount of practice on the cadaver. W. von Muralt²¹⁴ gives his experience with tracheotomy and intubation at the Children's Hospital in Zurich. From 1874 to 1890, 318 tracheotomies were performed with 35.6 per cent. recoveries; 56 intubation cases gave 37.5 per cent.; 18 secondary tracheotomies were performed, with only 1 recovery. The number of intubation cases is here too small to make the comparison of any great value. The fallacy of striking percentages from a limited number of cases in such a complex disease as croup, in which so many factors besides the laryngeal stenosis contribute to a fatal result, is well illustrated in my third series of 100 cases. When I reached the eightieth case of this series, I had 30 recoveries, followed by 25 consecutive deaths. Von Ranke³⁴ reports 365 cases of intubation performed for diphtheritic croup in Germany, Austria, and Switzerland during the past year, with 40.5 per cent. recoveries. He compares this

number with 137 tracheotomies, also by different operators, which gave 32.8 per cent. recoveries. In von Ranke's previous report a larger number of cases by both methods of intubation yielded 34 per cent. and tracheotomy 38.1 per cent. The author attributes the better results obtained by intubation, of late, to the greater experience which the operators have acquired and to the more perfect tubes employed. His own improved results he attributes, in part at least, to leaving the string attached, by which the attendant could quickly remove the tube in case of necessity. Ranke also emphasizes the fact that, since employing properly-constructed tubes, ulceration has seldom been found. Jacques, of Marseilles,¹¹⁸ reports 68 cases of croup treated by intubation, with 30.8 per cent. recoveries. Dillon Brown⁵¹ contributes a valuable paper calling special attention to some of the modifications, or so-called improvements, of the intubation-tubes that have been made, and the dangers resulting from their use. He also gives a tabulated report of 350 cases of croup intubated by himself, with 28.5 per cent. recoveries.

Joseph Eichberg⁵³ reports an accident which, I believe, is unique, a result of neglecting the precaution of leaving the string attached long enough to be certain that the tube is properly placed and the dyspncea relieved. In Eichberg's case the thread was removed immediately, while the finger was still in the throat. On looking at the introducer it was found to have broken off close to the obturator, leaving the latter in the tube, which completely occluded it, thus preventing the use of the extractor. A hasty tracheotomy was performed, and the child was resuscitated by means of artificial respiration.

Moll, of Belgium,¹³⁶ reports 92 cases of croup treated by intubation, with 37 recoveries, or 40.2 per cent.; 6 of the cases were under one year, with 2 recoveries; 8 in the second year, with 3 recoveries; and 17 in the third year, with 7 recoveries. Egidi, of Rome,⁵⁸⁹ after a very limited experience with the operation, criticizes the length and small calibre of the intubation-tubes, and has therefore modified them by making them shorter and larger. These tubes resemble very closely the ones that I devised to facilitate the expulsion of loose membrane from the trachea, and which were intended to be left in position only for a few hours at a time, because of the danger of ulceration from their

increased size. Of the many crimes that have been committed in the name of intubation the greatest is chargeable to the host of modifiers, who have never yet produced anything but instruments of torture, and never can produce anything else, because every important improvement made during the evolution of this procedure was suggested by the post-mortem findings. Had Ezidi stated that the tubes were too short and too large he would have stated important facts.

While it would be an advantage to have longer tubes, which would still further diminish the danger from obstruction by loose membrane in the lower portion of the trachea, they have not been made longer, because this would render the introduction more difficult. By careful workmanship the tubes could be made smaller without reducing the calibre, by making the metal as thin as possible where it should be thin; but this would increase the cost, which is out of the question, owing to the competition between the manufacturers. In estimating the proper size of a tube, it is the subglottic division of the larynx alone that must be taken into account. This portion of the respiratory passage, which is comparatively narrow in the normal condition, in croup is reduced to a real hour-glass contraction; and it is at this point that pain is not unfrequently produced by the tubes of present size when otherwise perfectly made, because the inflamed mucous membrane is compressed between an unyielding cartilaginous wall on one side and the metallic surface on the other. If this pressure be too great, ulceration or sloughing of the mucous membrane must be the inevitable result. The use of small tubes, which alone renders intubation in croup possible, is therefore based on the anatomical fact that a certain portion of the respiratory tract is very small, and on the physiological fact that respiration can be carried on perfectly through a fraction of this small opening.

INTUBATION IN CHRONIC STENOSIS.

John O. Roe¹⁷⁰ reports the case of a woman, aged 40, whom he intubated for the relief of urgent dyspnoea due to subglottic gumma. The tube was coughed out on the fourth day, and was not again needed, as the pressure of the tube reduced the size of the growth sufficiently to leave ample breathing-room. Roe does not state whether he guided the tube into the larynx by the

aid of the mirror or by the sense of touch. I believe that in chronic cases, in which the throat has become more or less accustomed to the use of instruments, intubation can be performed with greater facility and with less discomfort to the patient by the aid of the mirror than by the usual method. In such cases and in such only can the laryngologist be an intubationist, without the practice which is absolutely necessary to perform the operation by the sense of touch alone. When the tube has been guided into the larynx and carried as far down as it can be by the introducer alone, the mirror must be dropped quickly and the finger inserted to push the tube well home and hold it down while the obturator is being removed.

During the current year I was present when W. K. Simpson intubated two adult cases of chronic stenosis by the aid of the mirror. One was the result of traumatism and the dyspnoea has been relieved up to the present time—seven months—by the retention of the tube for seven days. The other was syphilitic and was intubated eleven months ago without any return of the obstruction, so far. Tube worn eight days, two sizes being used. In both of these cases considerable force was required to pass the smallest adult size, and had it been done by the usual method there could have been no certainty that the point of the tube was not engaged in one of the ventricles instead of in the stricture, and the operator would have felt some hesitancy in using the necessary amount of force.

F. Massei, of Naples, corresponding editor, after first strenuously opposing the introduction of intubation into Italy, is now an enthusiastic advocate of the operation, especially in the treatment of chronic stenosis, of which he has operated on 12 cases: 5 syphilitic, 3 tubercular, 2 after tracheotomy, 1 papilloma, and 1 case of pachydermia. The significance attached to the results obtained in a small number of cases of chronic stenosis of the larynx treated by intubation is very different from that to be derived from an equal number of cases of croup, because in the former there are none of the complications that exist in the latter. It matters not how badly the patients swallow, no pulmonary complications ever occur, or, at least, ever have occurred in my experience. Massei says that all his patients were able to swallow solid food with the tube in the larynx, and one could swallow liquids.

In only one of my own cases was there ability to swallow perfectly all kinds of food and drinks retained from the moment the tube was placed in the larynx. My own experience has been that these cases swallow almost as imperfectly as do children after intubation for croup, but that this difficulty is overcome much more rapidly in the former than in the latter. Massei intubated all his adult cases under the guidance of the mirror, and the longest time in which a tube remained continuously in the larynx was eight days.

In cicatricial stricture of the larynx, after thorough dilatation has been accomplished, intermittent intubation, extending over a considerable period of time, will be required in order to effect a cure. My first case was of this nature, and required occasional dilatation for three years to accomplish a permanent cure. The intervals between the intubation were at first one week, which was finally extended to two months, the tube being left in position from one to three days on each occasion. This patient was intubated over seventy times. The set of instruments devised for such cases consists of ten tubes, an introducer and extractor. The tubes vary in size—from the smallest, through which an adult can breathe with comfort, to the largest, that will enter the normal larynx with ease. The increase in size is very gradual, on the same principle as the urethral sounds, and the dilatation should be accomplished in the same manner to avoid ulceration from undue pressure.

In my experience with intubation in croup, two new developments have occurred during the year, one of which calls for a slight modification of the tubes as at present made and the other for the construction of special tubes to meet the indications. The first of these is the engagement of the distal end of the tube in one of the ventricles of the larynx and the difficulty sometimes encountered in passing this point except by making a false passage. In the last edition of the ANNUAL, Ingals refers to 2 cases reported by Gaughofner, of Prague, in which he had found it impossible to pass the tubes, owing to the smallness of the glottis from œdema. Ingals also reports a case of his own, 16 months old, in which he had failed, after repeated attempts and the employment of considerable force, to introduce the smallest-sized tube. The obstruction met with in these cases was undoubtedly the ventricles, and not œdema. The last of many communications that I have received

detailing similar experiences was from Carl H. von Klein, of Cleveland, asking if I could explain why he had failed to intubate a boy 4½ years old after having operated on 139 cases. Klein, after having failed to pass the size proper for the age, tried the smaller sizes, even to the smallest in the set, with the same result. He then endeavored to insert a sound still smaller, but this met with the same obstruction, and the child had to be left to its fate, as tracheotomy would not be permitted. A less experienced operator would have found no difficulty in intubating such a case, because he would have used force enough to penetrate the tissues, and the resulting apnæa could be readily explained as due to membrane pushed down before the tube. While I have often had the progress of the tube arrested by entering one of the ventricles, I never found any great difficulty in disengaging it by rotating the introducer or otherwise changing the direction until a few months ago, when I was called to the New York Foundling Asylum to intubate an infant 5 months old, in which the resident physician had failed after many trials. After four careful and prolonged attempts, I was about to give it up as useless, when it occurred to me that if the long diameter of the tube could be brought across the long diameter of the chink, either transversely or obliquely, the increased size in this direction would prevent it from engaging in the ventricle. This was accomplished by swinging the handle of the introducer well around in the left angle of the mouth, when the tube slipped in without difficulty. This impediment to intubation, therefore, results from the entering portion of the tube being too small instead of too large, and the remedy consists in increasing the size of the distal extremity by making it cylindrical instead of oval, as at present constructed. I believe that this device will overcome the difficulty by presenting a blunt end too thick to enter these sacs, and will also render the making of a false passage almost impossible. Both of these advantages will be nullified if the obturator should extend through any farther than is necessary to complete the probe-point. It will also diminish the danger of ulceration on the anterior wall of the trachea by distributing the pressure over a larger area.

When a ventricle has once been entered and dilated, which a moderate amount of force will do, it is almost impossible to get beyond this point by subsequent attempts, except by making a

false passage. This is a common experience in practicing on the cadaver. No form of acute stenosis of the larynx, when situated in or above the chink of the glottis, ever offers any very serious impediment to passage of a tube of the proper size. The infiltration of the mucous membrane, which is the principal cause of the obstruction in croup, is rarely, if ever, confined to these parts, but extends to the subglottic division of the larynx; and, this being small in the normal condition, any considerable swelling of the tissues—which can only occur toward the centre, as it is completely surrounded by the cricoid cartilage—reduces the breathing space, in some cases, to a mere pin-hole. In extreme examples of this kind, a moderate degree of which is shown in Fig. 1, considerable force will be required to pass even a smaller size than the tube



FIG. 1.—PIN-HEAD RESPIRATORY PASSAGE DUE TO SWELLING, AS AN OBSTRUCTION TO THE INTRODUCTION OF A TUBE.

suitable for the age. While this modification of the tubes, which increases the size of the entering portion, will render intubation more difficult in this class of cases, the operator can be reasonably certain that when unusual resistance is encountered he is not in one of the ventricles, the only other obstacle met with inside the larynx, and can use sufficient force to pass the stricture without danger of making a false passage.

RETAINED LARYNGEAL CANULAS.

In my own cases the longest time a tube has been retained in the larynx in croup was twenty-nine days. During the current year I have seen 2 cases in which it was impossible to dispense

with the tubes, owing to the development of granulation tissue springing from the antero-lateral aspects of the larynx just above the ventricular bands. These points correspond to the greatest transverse diameter of the head of the tube, and therefore to the points of greatest pressure, in the vestibule of the larynx, during the constriction of the latter in the act of swallowing. This tissue gradually grows upward and backward until it obstructs inspiration by partially overlapping the aperture of the tube, and when the latter is removed drops into the chink of the glottis and produces still greater obstruction. This evil is remedied by lifting the tube higher in the larynx, and this can be done only by increasing the thickness of the head in the vertical direction and by giving the

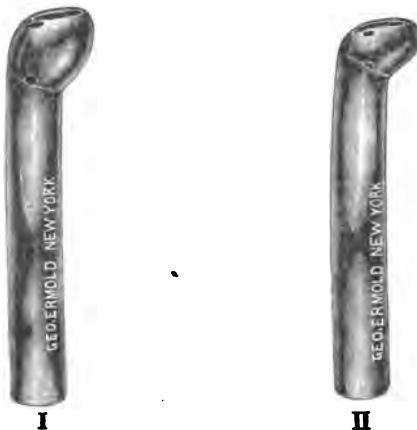


FIG. 2.—TUBES WITH THICKENED HEADS TO RAISE OPENING.

upper portion of it a greater backward curve, which carries the opening as far away from the obstruction as possible. This device not only relieves the dyspnœa for the time, but also proves curative by bringing pressure to bear on the new growth, and thus causing its absorption. Fig. 2 (I) shows a cut of the tube used in one of the cases referred to, by means of which a cure was effected ten months after the first intubation. The other tube shown in the cut (II) represents those in ordinary use. The second case at last accounts was still wearing a tube with a still thicker head, made higher in front than behind, but otherwise the patient was in excellent health. This complication is the result either of badly-constructed tubes, as it was in one of these cases, or of leaving the

same tube in position too long. In slow cases the points of pressure should be changed by removing the tube about once a week and using a larger or smaller size, or one specially constructed on the principle shown on page 9.

DISEASES OF THE THYROID GLAND.

BY FRANKLIN H. HOOPER, M.D.,

AND

J. PAYSON CLARK, M.D.,

BOSTON.

Anatomy and Physiology.—Lalitte,¹⁸⁴ in considering accessory thyroid glands, refers only to those isolated from the thyroid in intra-uterine life. There have been fifteen recorded observations of such accessory glands. They are capable of suddenly increasing in size and causing grave accidents by compressing surrounding organs. The author believes these glands to be congenital because they often receive vessels of a different origin from that of the thyroid arteries, besides appearing in regions where the true thyroid could not send prolongations. Furthermore, they are always inclosed in capsules presenting on their surface no sign whatever of an old pedicle. W. Lindemann⁸⁴ concludes, from investigation, that the nerve-supply of the thyroid comes exclusively from the vago-sympathetic. Only two nerves enter the gland,—one from the recurrent, the other from the superior laryngeal. O. Langendorff,¹²¹ as the result of histological experiments on the thyroids of calves and puppies, finds that the gland lacks an excretory duct. The thyroid consists of follicles which have an epithelial wall, and contain, as do also the wide lymph-spaces, a colloid substance. This substance is secreted by the epithelial cells, and is probably not removed by the lymph- or blood- vessels, but stored in the gland itself, where space for fresh material is constantly being acquired by gradual loss of water from the colloid substance, atrophy of epithelium, and formation of new follicles. Biondi,⁶ states that the special secretion of the thyroid in reptilia, apes, and mammalia is produced by the columnar epithelium lining the acini. He further holds that the subcapsular and pericapsular layers are capable of regenerating the gland, and therefore the capsule should be left in all excisions. Edmund Owen²² reports the unique case

(H-1)

of a boy who had a sinus in the median line of the neck a little above the hyoid bone, at first thought to come from a tuberculous gland, but found to be a duct running up into the base of the tongue. It was probably the remains of the embryonic thyroglossal duct, from the lower part of which the thyroid gland is developed. Chauvel ⁸ reports a spontaneous aneurism of the inferior thyroid artery. Aneurisms of the thyroid arteries are rare. Laulanié ⁵⁵ _{May 20} concludes, from experiments on dogs, that the secretory theory of the action of the thyroid is the correct one, rather than the vasomotor or haemopoietic. He finds that the urine of dogs, after complete thyroidectomy, is moderately abundant, alkaline, and heavily charged with biliary salts (with probably a trace of albumen). This urine injected into a rabbit is found to be five or six times more toxic than normal urine. The liver and kidneys of dogs, after complete thyroidectomy, showed inflammatory and degenerative changes such as occur in toxic cases from other causes, (thus proving the presence of a poison in the system as a result of complete thyroidectomy). Gouguenheim, corresponding editor, Paris, reports that Gley has repeated Laulanié's experiments, and has not found the urine of dogs, after thyroidectomy, to be as poisonous as the latter affirms. The toxicity develops gradually and is, Gley thinks, especially the effect of the profound digestive troubles caused by the operation. He compares it to the effect obtained from the injection of urine of exhausted animals.

GOITRE.

Thyroiditis.—Gérard-Marchand ¹⁴ _{June 21} reports an interesting case of thyroiditis of spontaneous development. The gland was not enlarged prior to the attack, although it had formerly been considerably hypertrophied. Bacteriological examination of the pus, withdrawn under strict antiseptic precautions, revealed the presence of pneumococci. It is the first case of the kind on record. F. Colzi ³ _{Aug. 19} reports the case of a young man who had a goitre which had given him very little trouble. After an attack of typhoid fever an abscess formed in the gland, which was opened aseptically. A microscopic examination and a culture showed the presence of the typhoid bacillus in a pure state. Nicaise ⁸ _{May 2} reports 2 cases of metastatic thyroiditis operated on by Kummer and examined bacteriologically by Tavel. In the first, goitre had existed for fourteen

years. The patient was attacked with diarrhoea and fever; two days later, severe pains in right side of neck. The thyroid became inflamed and respiration was impeded. Kummer removed the right half of the thyroid, which was found to contain two cysts,—one colloid, the other inflamed. The latter was found to contain the typhoid bacillus (of Eberth). This established the nature of the original disease. The second case was one of post-puerperal thyroiditis. The goitre had existed a long time, increasing with each pregnancy and diminishing afterward. This time there was dyspnoea. The left lobe was extirpated and an abscess with very thick walls was found. In the pus were numerous streptococci which had, doubtless, invaded the organism at the time of labor. Both cases recovered. These facts go to show that the agent of suppuration is not unique. Spirig¹¹² divides the so-called complications of typhoid fever into three groups according to their bacteriological origin: (1) suppurative and inflammatory action alone (streptococci and staphylococci); (2) in which the typhoid bacillus appears in addition; (3) in which the typhoid bacillus alone is found. To the first group belong, generally, all cases of struma after typhoid. The author reports a case of abscess of the thyroid belonging to the second group.

Cases.—R. Paltauf⁸⁴ reports an intra-laryngeal thyroid tumor. There are only five or six such cases in literature. The patient complained of dyspnoea. On laryngoscopic examination a tumor could be seen under the right vocal cord. Three months later abscesses appeared in the left lobe of the thyroid, the patient finally dying of general septicæmia. On post-mortem examination the tumor was found to consist of thyroid tissue and to be connected with that gland. It was probably congenital, due to an ingrowth of the thyroid through the interstitial membrane of the tracheal wings. Wolff⁵⁵ reports a case of accessory thyroid in the base of the tongue, removed for great dysphagia. Recovery. Reuter⁶⁹ describes a case of wandering thyroid. It arose from the right lobe, lay behind the sternum, and caused paralysis of the right vocal cord by pressure on the right recurrent laryngeal nerve. The tumor could be brought above the sternum by coughing. B. Weisner⁸⁴ reports a similar tumor from the left lobe. Bruns⁶⁹ extirpated a goitre remarkable for its extraordinary size. It was a cystic tumor reaching nearly to the umbilicus, and its antero-

posterior diameter was twice as great as that of the chest. Owing to the weight of the tumor the trachea was bent forward, the cervical spine was lordotic, and the thorax flattened. The thyroid vessels were tied before extirpation. Cure. Rossander ⁶ says that degeneration of the thyroid is rare in Sweden. Of 141,045 patients only 84 had diseases of the thyroid, whilst of 31,312 operations only 102 were directed against diseases of this gland. L. E. Stevenson ⁶ says that goitre in young people seems more liable to be followed by serious symptoms than in the adult. The trachea is less adapted to resist pressure, and the presence of a goitre seems to excite spasms of the glottis more readily in youth. He reports 4 cases in the young, in all of which excision of one lobe for dyspnoea was performed, after trying other remedies, with resulting cure in all cases and a marked diminution in the size of the other lobe. Some writers believe that these attacks of dyspnoea are allied to asthmatic seizures, but the author has never seen them relieved by inhalations of chloroform, as would then be expected. Freund ⁵⁵ has found that thyroid enlargement is very frequent in women who have uterine fibromyoma. In 56 cases of a gynaecological affection with enlarged thyroid, 44 times the former was a fibromyoma.

Etiology.—A very careful and original study has been published by Lustig and Carle. ¹²¹ Their observations were in the valley of Aosta, where goitre is endemic, and their conclusions are as follow: (1) All the examinations of water used for drinking purposes by the subjects of endemic goitre revealed the presence of numerous bacteria; (2) the constant presence, in variable quantity, of a bacillus which liquefies gelatin, and has special morphological and biological characters; (3) this water, given to horses and dogs in a district exempt from goitre, produced an enlargement of the thyroid; (4) it is not yet proved that elimination of the microbes destroys the power of the water to cause goitre. The results of Theodor Kocher's investigations ⁸⁴ as to the appearance and distribution of goitre in the canton Bern, in Switzerland, differ in many ways from those of Bircher, which appeared in 1883. More important in a causative way than the stone formation are the impurities of the stone through organic or organized admixtures. The drinking-water carries the harmful agent. "Goitre water differs from goitre free water in containing many more micro-organisms." The author

recommends the building of institutions for the rearing of young cretins in exempt regions, and institutions for adult cretins even in cretinoid regions. James Berry ² _{Jan. 1880, 1887} publishes three interesting lectures on the pathology, diagnosis, and treatment of goitre, in which he gives a history of the disease and discusses various methods of treatment. Goitre in England is most prevalent in the carboniferous lime-stone regions. A series of experiments made by the author and his brother, by feeding guinea-pigs with various salts which occur in goitrous water, were entirely negative. Probably neither climatic nor atmospheric conditions share in the causation, nor want of air and sunshine, as has been sometimes suggested. The author thinks that goitre is due to some poison, probably one of the mineral ingredients, in the soil, generally conveyed by drinking-water. Armaingaud ¹⁸⁸ _{Oct. 1886} makes a report on goitre in France, in which he says that the disease has not sensibly diminished, even if it has not increased there. The amelioration of hygienic conditions, the progress of well-being, and the diffusion of instruction in goitrous communities have not had the preventive or curative influence expected. In all these measures the specific cause, consumption of goitre-making water, has not been touched. As suggested in this report, it was proposed by the Congress of the Pyrenæan Association to further new clinical and bacteriological researches in waters known to be goitrogenous; for prophylaxis, to advise the use of the Chamberland filter in certain goitrous regions, principally in institutions such as barracks, prisons, hospitals, etc., and, if need be, at the expense of the State, to incite or even to organize methodical and scientific filtration. Further, to advise populations of goitrous regions to boil and aérate drinking-water; to use maritime sanitaria for the treatment of goitrous children; to have military doctors note carefully soldiers even slightly affected with goitre, in order to make the statistics more exact.

Diagnosis.—Alex. F. Matveieff ² _{Sept. 1881} reports the case of a man with a tumor of the neck of five years' standing. It was soft, solid, slightly lobulated, and occupied the whole space between the sternum and the thyroid cartilage. A parenchymatous goitre was diagnosed, but, on removal, the growth was found to be a fatty tumor, adherent to the anterior wall of the trachea. A. Foxwell ² _{Apr. 1882} reports a case of supposed goitre, which, on further examination, was found to be a great hypertrophy of both sterno-mastoid

muscles resulting from extreme dyspnoea, due to a post-manubrial tumor (probably enlarged glands) pressing on the bifurcation of the trachea.

Treatment.—Bally² reports the results of operation in 77 cases of goitre, treated at the clinic of Socin, at Basle, from January, 1887, to September, 1889. Of these 24 were cystic, 24 colloid, 19 mixed, 7 parenchymatous, 1 fibrous, 1 cystic adenoma, and 1 a fetal adenoma. Five were treated by puncture and injection, 1 by total extirpation, 14 by partial removal, and 58 by intra-glandular enucleation. The conclusions arrived at, from a study of these cases and of those reported by others, are: intra-glandular enucleation of one or several goitrous nodules is usually practicable, except in cases of malignant struma, diffuse parenchymatous or colloid hypertrophies of the gland, exophthalmic goitres, or goitres with numerous disseminated nodules. The layer of tissue separating the capsule of the gland from the goitre is readily detectable; haemorrhage is usually not alarming. In the rare cases where it does become so, the thyroid vessels may be ligated and partial excision performed. Injury of nerve-fibres and the resulting paralysis of the vocal bands are avoidable. The probability of recurrence is not greater than in partial extirpation. In no case were unfavorable results, as tetany or cachexia, observed, and in none of the cases of partial extirpation did the tissue left behind disappear.

J. H. Lloyd¹¹² reports 2 cases of probably parenchymatous goitre successfully treated by galvano-puncture, the first after 14 applications extending over a period of six months. The method was as follows: The positive pole was connected with a large flat sponge-electrode placed on the nape of the neck. To the negative pole was attached, by a branching cord, three small gold-plated needles insulated to within one-third inch of the point. These were inserted well into the tumor, so that the insulating material protected the skin, veins being carefully avoided. As strong a current as possible without too much pain was used. The needles were kept scrupulously clean, but no antiseptic agents were used (the galvanic current in the strength employed is probably antiseptic). The greatest strength reached was 24 milliampères; but this could not be long endured, as it caused much pain, giddiness, and salivation. The average was probably from 14 to 18 milliampères. An accurate milliampèremeter was used; also a water

rheostat to avoid shocks. The length of each sitting was about twenty minutes. The results of an individual application were these: The gland-tissue became swollen around each needle, sensitive to pressure, and gas, probably hydrogen, escaped from the punctures. The skin was, at times, reddened for some distance beyond the gland, and occasionally the points of puncture were distinctly burned from defective insulation. For a day or two after the sitting the gland would be very sore and look as if it were going to suppurate (which it never did). Permanent results did not appear for some time after treatment was commenced, and the diminution of the gland continued for some time after treatment was stopped. C. M. Shields⁵¹ reports four cases of goitre treated by galvanism (the electrodes being applied to the skin). All had been previously treated by other means. Three were cured and one reduced two-thirds in size. Fifteen to thirty Leclanché cells were used. The sittings were two to six days apart. Otto Juettner⁵², says that cutaneous galvanism has only a temporary benefit, but that galvano-puncture seems to be absolutely and permanently curative in the cases he has seen. Rossander⁵³ states that in suitable cases injection of tincture of iodine is a valuable treatment, especially in cystic goitres, which form 40 per cent. of the cases. In 32 cases total extirpation was performed, with no evil consequences (myxœdema or tetany). F. Kapper⁵⁴, reports 15 cases of parenchymatous goitre treated with injections of iodoform after the Mosetig-Moorhof method (see ANNUAL for 1890). The results were most gratifying. In 150 injections there was not the slightest unpleasant symptom.

G. H. Rodman⁵⁵, believes that the method of relieving sudden dyspnoea associated with thyroid tumors by intubation with an ordinary large-sized catheter is not easily effected nor liable to relieve the dyspnoea, which, he thinks, is due to a nervous element, as in spasmodic asthma, acting on the bronchia and bronchioles. He would try inhalations of chloroform and nitrite of amyl. Seil H. Auerbach⁵⁶ reports a goitre treated by parenchymatous injections of osmic acid, local massage (fifteen minutes daily), and iodide of potash internally. The acid was used in aqueous solution, 1 grain (0.065 gramme) of crystallized acid to 2 drachms (8 grammes) of water. A syringeful was injected daily or every other day for three weeks, in which time the tumor

decreased one-half in size and all subjective symptoms disappeared. A. Reverdin¹³⁶ reports a series of 14 thyroidectomies, 10 in women, 4 in men, with 1 death in a case where the trachea was much softened. He makes a large linear incision following the anterior border of the sterno-mastoid. Wm. Stokes¹³⁷ reports 7 cases of operation on the thyroid,—3 for unilateral and 4 for bilateral enlargement. One of the first group was cystic, the other 2 parenchymatous. In these latter there was great haemorrhage, 1 case dying on account of it. In one of the bilateral cases the lobes were removed at 2 operations. Three weeks after the second operation the patient died with symptoms of cachexia thyroopriva. The other 3 cases were treated by ligature and removal of a part of the isthmus, with resulting shrinkage of the tumor. T. Stoker¹³⁸ gives his conclusions as to the advisability of operating on the thyroid: 1. That it is a proceeding of great gravity to remove even a part of the thyroid, as the possibility of severe haemorrhage cannot be foreseen. 2. Removal of the entire gland is unjustifiable from the danger of myxoedema. 3. Thyroidectomy is too grave an operation for mere cosmetic purposes. 4. Removal of half the gland has been undoubtedly followed by shrinkage of the remaining enlarged portion. J. B. Deaver⁶¹ considers the indications for surgical interference in goitre to be: (1) tracheal stridor; (2) dyspnoea; (3) dysphagia; (4) a rapidly-growing goitre, particularly downward; (5) deformity. As regards the last indications, in which most surgeons would probably not agree, the author thinks thyroidectomy of a unilateral goitre justifiable if the patient is of suitable age and in good health and the deformity of the neck is greatly objectionable. In a bilateral struma he believes in a double ligature and division of the isthmus between the ligatures. James Berry² uses the oblique incision. The vertical incision is suitable for small goitres near the middle of the neck. The angular or curved incision gives a little more room where the goitre is very large.

EXOPHTHALMIC GOITRE.

Etiology.—Charcot¹³⁹ considers exophthalmic goitre a branch of the neuropathic and closely related to the arthritic family. H. W. G. Mackenzie⁶ _{V.2, No. 11, 18, 19} has often seen it preceded by acute rheumatism or angina (5 and 9 cases respectively in 40). Fear seems to be an etiological factor. A. Weill and M. S. Diamant-

berger ²² endeavours to show, in a review of 18 cases, that there is a close affinity between rheumatism and Graves's disease. The physiological and anatomo-pathological data are too few to formulate any conclusions from this relationship.

Pathology.—Chevalier ⁷⁵ says the tachycardia is due to an affection of the nucleus of the vagus, struma and exophthalmus being dependent on the tachycardia. The cause of the disease is an intoxication of the nervous system by products of the thyroid. Boinet and Silbert ⁴⁶ found three principal varieties of ptomaines in the urine of a case of exophthalmic goitre. One possesses a convulsive action, also slows the heart, weakens the systole, causes arrhythmia, increase of the diastole, and arrest of the heart in diastole. Another causes a primary increase in systolic energy, then enfeeblement of the heart-beats and arrest of the heart in diastole. Most of these ptomaines are convulsives and some arrest the heart in systole.

Symptoms.—H. W. G. Mackenzie, ⁶ in 30 cases of Graves's disease, never failed to find trembling. Cramps, attacking hands and forearms, but especially feet and legs, usually at night, are very frequent. Giving way of the legs was noticed 12 times; weakness of external rectus of the eye, once; bronzed skin, 5 times; thinning of the hair, oedema of the legs and eyelids often; also epistaxis. Liebrecht ⁸⁵⁸ reports 3 cases of exophthalmic goitre, with double vision, from ophthalmoplegia externa, in 1 case double. In this case there was also rapid tremor of the eyelids. James Finlayson ⁴⁷ has observed oculomotor paralysis in a case of exophthalmic goitre. Sharkey ² has found Graefe's lid symptom in 12 out of 613 patients of all kinds. People in health could not infrequently cause it by staring. As it often fails in exophthalmic goitre, its diagnostic importance is not great. A. Völkel ²⁰⁰ reports a case, and finds 20 such in literature, in which exophthalmus appeared in one eye before it did in the other. In his case the interval was one year. H. W. D. Cardew ⁶ has found diminished electrical resistance in 15 out of 20 cases of exophthalmic goitre. But this sign is worthless for diagnosis, as the electrical resistance varies with the moisture of the skin. The writer is able to demonstrate that the resistance greatly lessens when the skin perspires. A. Maude ¹⁵ calls attention to the paroxysmal attacks of diarrhoea, which occur more often in Graves's

disease than is generally supposed. Another, not so common, digestive symptom is unnatural craving for food (*boulimia*). It occurs in two forms: one in which the paroxysm extends over several days at long intervals, the other in which the paroxysms occur almost daily, several times a day for periods of an hour or so. Haemorrhage from the stomach and intestines may accompany these crises. It is small in amount and the blood bright. These troubles occur only in confirmed cases. Diarrhoea may, however, be an early symptom in a rapidly developing case. Boinet and Bourdillon⁴⁶ report 2 cases which present some original characteristics. One showed a rapid tremor of the tongue which, Féreol says, does not occur in exophthalmic goitre. There was a persistent cephalalgia. When this was severe the trembling of the tongue increased, but diminished when it was relieved by antipyrin. Other symptoms were: trifacial neuralgia, paresis of right arm, vertigo from time to time, jaundice, and haematemesis. The other case had choreic movements, appearing with exacerbations of the other symptoms.

Complications.—Federn²⁸² believes, after a number of observations, that partial atony of the large intestine is a frequent and important complication, perhaps even a cause, of exophthalmic goitre. Its frequent association with other neurotic troubles has been noticed by all observers. C. M. Hay²⁰² reports 3 cases complicated with mental disease. The pathology throws little light on its connection with mental disease, and, if any direct relation exists, it still awaits discovery. The mental symptoms in these 3 cases were essentially the same, and closely resembled ordinary melancholia. Memory remained intact in all, while all other mental functions suffered more or less severely. P. Schenk²⁰¹⁰ reports 4 cases with marked symptoms of insanity of different forms. In all there was a great increase of mental excitability. V. Budde¹⁸ reports 2 cases attacked later by diabetes mellitus.

Diagnosis.—Soucques⁸ finds, contrary to the assertion of Kast and Wilbrandt, that limitation of the field of vision does not belong to the clinical picture of exophthalmic goitre, and that its presence, in the absence of material lesions of the brain, fundus or media of the eye, should suggest the co-existence of hysteria. These conclusions are based on the examination of 12 cases, in 10 of which the field of vision was normal, in 2 diminished. In these

2 cases hysteria was also present. Charcot¹⁸ says that the quickening of the pulse may be overlooked, as at times it only comes on in paroxysms.

Treatment.—In anaemic cases preparations of iron have been found useful by Jaccoud,²⁵ but where anaemia is absent their employment is hurtful. In the early stages disorders of menstruation, which play an important part in etiology, must be treated. Hydrotherapy and electricity form the best treatment. Tepid or even warm douches should be used at first, daily for 25 to 30 seconds, the temperature being gradually, after a time, reduced until quite cold water is borne. The best form of electricity is bilateral galvanism of the neck by daily applications of a weak current (8 to 10 cells). Charcot recommends the Vigouroux method (faradization of the precordial region with galvanism of the neck). A milk diet in severe cases is one of the most powerful aids to treatment. It should be continued for weeks or even months. Jaccoud finds nearly always relief from treatment, but rarely complete definite cures. Applications of ice to the precordial region and neck must not be adopted unless the patient can be carefully watched, for, though sometimes very useful, there is always danger of aggravating the circulatory troubles and causing inflammation and sloughing of the distended skin over the thyroid. Dana¹¹ has used forced respiration with success. This treatment was suggested by Fiske-Bryson's paper (see last ANNUAL). A. F. Plicque¹⁰⁰, gives, very minutely, the operative technique for the treatment by faradism of exophthalmic goitre. He considers all the small details of application important, and the description of them would take more space than we can give here. Improvement is prompt; but six months, a year, and even longer, of treatment is required before all symptoms disappear. F. Lemke⁶⁹ strongly advocates surgical treatment in this disease, and bases his advocacy on good results observed after partial extirpation in 2 well-marked cases. From the first patient, a young man, the left (larger) half of the gland was removed. The exophthalmia and other symptoms quickly disappeared, and seven months later the patient was perfectly well. The other case was a man of middle age, from whom the right half of the goitre was removed, with resulting disappearance of the exophthalmia and great improvement in the action of the heart. Caird³⁶ reports the excision, after Kocher's method, in a

case of exophthalmic goitre of the right lobe of the thyroid, with marked improvement of the symptoms. C. M. Hay²² says that, since a certain proportion of cases finally become insane, the indication is to place around such patients the same prophylactic precautions which are necessary in cases having a hereditary predisposition to insanity.

MYXŒDEMA AND CACHEXIA STRUMIPRIVA.

Etiology.—A. M. Stalker⁶ reports a case of myxœdema coming on after long-continued use of iodide of potassium for another affection. Such a sequence is interesting, considering the supposed virtue of iodine in some form in thyroid enlargement. A. C. Clark²³ reports the appearance of myxœdema in a case of hereditary insanity. Buzdygan¹¹ considers that there exists in females a certain connection between changes in the genital apparatus and the development of myxœdema.

Treatment.—W. J. Collins⁶ transplanted the whole thyroid of a sheep into the submammary region of a myxœdematous woman. Four weeks after the operation the patient had improved in general condition and appearance. A myxœdematous patient of Merklen's,⁸⁰ who had suffered for ten years with metrorrhagia, had a thyroid graft from a live sheep inserted in the right submammary region. The metrorrhagia ceased in three days, and had not returned seventy-two days after. The permanency of the cure in both of these cases will depend on the "vitalization" of the gland. G. R. Murray² suggests trying the injection of thyroid juice in cases of myxœdema. He has tried it in 1 case with benefit. The patient, who had distinct symptoms of myxœdema, improved in every way. She had not perspired or menstruated for four years. Both these functions returned. The juice is prepared as follows: The gland of a freshly-killed sheep is cut up into small pieces and put into a test-tube with 1 cubic centimetre (16 minims) of glycerin and the same amount of a 0.5-per-cent. solution of carbolic acid. The tube is plugged with cotton-wool and allowed to stand in a cool place twenty-four hours. It is then squeezed through fine linen, by which means 3 cubic centimetres (49 minims) of a turbid pink liquid is obtained. This will keep fresh in a glass-stoppered bottle for at least a week, and may be given in two equal injections during the week. Between the shoulder-blades

is a good place for injection. Asepsis must be observed. Later, the injection is given less frequently. G. Vessale has made intravenous injections of a thyroid extract in dogs, after thyroidectomy, with beneficial results. L. Breisacher¹⁸² has made a number of experiments to solve the question whether the evil results of thyroid extirpation are due to the irritation of the neighboring nerves or to the removal of an organ important to life, but seems to arrive at no definite conclusions. He finds that meat or its extractives exert a poisonous influence on thyroidless dogs. G. Arthaud and L. Magon⁵⁵ conclude, from experiments, that a dog can live without the thyroid gland. E. Gley considers these experiments too few and the survival of the animal in question not sufficiently long, to be of value. He cites 300 cases of experimental thyroidectomy among which there is only 1 survival of any value. The above authors do not take into account the possible existence of an accessory thyroid. One cannot conclude, from an appearance of health lasting for several months, that an animal will really survive. Ughetti finds that, after thyroid extirpation, the kidneys become inflamed and degenerated—especially the cortex. G. Zuccaro²⁵ claims to have discovered in dogs, in addition to the thyroid, lobules of a different structure,—one in front and two behind the thyroid. They are said to correspond to the noduli embrionali of Horsley and the cumuli adenoidei of Virchow. If, on removing the thyroid, these lobules are left, the animals survive; if they are also removed, the animals die. The author believes that thyroid grafting will not prevent the results of thyroid extirpation, as the gland, in its new seat, quickly becomes degenerated and is absorbed.

MALIGNANT TUMORS.

A. Pilliet⁷ reports a cystic epithelioma of the right lobe of the thyroid. A tumor of the right lobe had existed for ten years, increasing more rapidly for several months. Langenbuch⁶⁹ reports a cancer of the thyroid in an old woman. The chief interest of the case was that a well-developed capsule separated it from the healthy gland-tissue. Pepper⁶ reports an excision of the thyroid for malignant disease. The right lobe contained two masses, each the size of a walnut, which were diagnosed as carcinomatous. J. Berry⁶ objects to the diagnosis of cancer in this case from the presence of "alveoli filled with cubical

cells," which, in the thyroid, does not necessarily mean carcinoma, but rather an adenoma, frequently found in innocent goitres. Another argument against the above case being carcinomatous is the existence of two separate masses, which, if the case were cancer, would probably be unique.

INEBRIETY, MORPHINISM, AND KINDRED DISEASES.

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MORPHINISM.

THE literature of the year on this subject presents but little that is novel or which modifies former views. There is a paper on the general subject of treatment, by Watson,²⁴² who favors rapid withdrawal as opposed to the "sudden" and the "gradual" methods, and who also favors the enactment of a law prohibiting the sale or advertisement of compounds for the cure of inebriety (opium or alcoholic), unless it has the State analyst's certificate that it contains no drugs that enslave. Lett,⁷⁶⁰ in a paper on treatment, favors "gradual withdrawal." He contends that abrupt withdrawal is barbarous, but admits that he has had no experience with the rapid method of withdrawal. Nolder⁸⁰¹ reports a case, which does not call for special comment, treated by rapid withdrawal, or, as he terms it, gradual withdrawal. Lefevre²⁴ calls attention to the lack of special institutions for the commitment and treatment of morphinomaniacs in France, urging the enactment of laws for their establishment. Gittermann,⁴¹ in a paper on treatment, favors rapid withdrawal. He refers to the use of codeine as a substitute in treatment, but confesses that he has been disappointed in the results, though he would not entirely discard it. In this connection may be mentioned a brief article by Mattison,¹⁷⁶ on "The Prevention of Morphinism," in which he urges the profession to substitute codeine for morphine whenever practicable, on account of the diminished risk of a habit being acquired. He is not willing to say, with Fischer, that "tolerance and habituation, analogous to morphine, are not caused by codeine," but admits that the snaring, seductive power of codeine is vastly less than that of morphine. Nor does he maintain that codeine, apart from its anodyne effect, is the equal of morphine in inflammatory conditions, nor that it has like power as a stimulant. Kaan⁵⁷ reports 4 cases of the morphine

habit, illustrative of a paper on "Moral Depravity in the Ethical and Sexual Spheres from Chronic Morphinism;" and Ball,²⁴ in a clinical lecture (see "Cocaine Habit"), recites a case of mixed addiction (cocaine and morphine).

Brazier,²⁴ _{July 19} reports a case of chronic morphinism, in which the drug was taken in solution by rectal injection in enormous doses, estimated at about 2 kilogrammes (5 pounds) in ten years; and Mattison¹⁹ _{Dec. 12, '70} relates a case in which a solution of morphia, 10 grains (0.65 gramme) to the ounce (30 grammes) of water, was used by insufflation for the relief of recurring headaches. The habit was acquired in this manner, and the quantity of morphia increased until a drachm (3.89 grammes) a day in from 4 to 8 ounces (30 to 240 grammes) of water was taken by the nose. Gorodichze²¹⁰ _{June} reports a case in which he combined the method, by gradual withdrawal, with hypnotic suggestion. Seventy hypnotic *séances* in twenty-four days resulted in a cure, without relapse. The patient was a female, aged 37, who took from 0.40 to 0.45 gramme (6½ to 7 grains) of morphia per day, hypodermatically. Mattison,¹⁸⁴ in a paper on "Opium Addiction as Related to Life-Insurance," contends that three years' entire abstention from opium, after not more than five years' addiction, all other conditions being favorable, should entitle an applicant to insurance. He has interviewed the medical directors of several life-insurance companies, and obtained the following expressions of opinion as to the length of time advisable, after a cure, to make an acceptable risk: Winston (Mutual), thought ten years overlong, but would demand it; Lambert (Equitable), after four years, if other conditions were favorable; Huntington, per Tuck and King (New York Life), three years, if otherwise healthy, and not more than 35, would possibly issue a ten- or fifteen- year endowment; Du Bois (Manhattan), four years; Brannan (Washington), five years; Wilber (Brooklyn, Northwestern, and Massachusetts State Mutual), would decline all such cases; Clark (Mutual Benefit, Newark, and Connecticut Mutual), ten years; Colton (Providence Life and Trust), five years.

Mattison¹⁷⁰ _{Jan.} has also raised the question of the relation of renal diseases to the opium habit. A collection of opinions from well-known medical writers elicited a number of contradictory opinions. In order to further a study of the question, the follow-

ing announcement¹⁸⁹ has been made: "With the object of advancing scientific study and settling a now mooted question, J. B. Mattison, of Brooklyn, offers a prize of \$400 for the best paper on 'Opium Addiction as Related to Renal Disease,' based upon these queries: Will the habitual use of opium, in any form, produce organic renal disease? If so, what lesion is most likely? What is the *rationale*? The contest is to be open for two years from December 1, 1890, to either sex, and any school or language. The prize-paper is to belong to the American Association for the Cure of Inebriety, and be published in the *New York Medical Journal*, *Brooklyn Medical Journal*, and *Journal of Inebriety*. Other papers presented are to be published in some leading medical journal, as their authors may select. All papers are to be in possession of the Chairman of Committee of Award on or before January 1, 1893. The Committee of Award will consist of Alfred L. Loomis, President New York Academy of Medicine, chairman; H. F. Formad, Philadelphia; Ezra H. Wilson, Brooklyn; Geo. F. Shrady, and Jos. H. Raymond."

Kiernan⁸⁸⁸ reports 3 cases of abstinence symptoms in newborn children of opium-taking mothers, who were unable to nurse them. In 2 of the cases there was marasmus, followed by convulsions, which were relieved by paregoric, gradually reduced. In the third case, after losing two babies by marasmus, the mother, in a third pregnancy, submitted to the gradual withdrawal of the drug, quinine, strychnia, and cannabis Indica being given. This child did not develop opium-marasmus, and the mother had a good supply of milk. He reviews the former literature on this subject. (See ANNUAL of 1889, D-18). Guinard²¹¹ has experimented on cats, in Arloing's physiological laboratory, for the purpose of producing acute and chronic morphinism in these animals. It is his intention to make similar experiments upon the other domestic animals. The principal conclusions of the work are formulated as follows: (1) morphine is always, and in all doses, an excitant and convulsant to the cat; (2) this is manifested by agitation, hyperexcitability, hallucinations, and a restless drunkenness; (3) contrary to what is observed in all species of animals in which this drug is a hypnotic, the pupils are dilated, the respiration and the heart are accelerated, the chilling of the peripheral parts indicate vasoconstriction, and there is an abundant hypersecretion of saliva;

(4) the employment of large doses produces an exaggeration of the symptoms mentioned, and a modification in the gait of the animal is observed,—it frisks about, and convulsive shocks follow, similar to those described by Amblard and Grasset in dogs; (5) when a dose of 0.04 gramme ($\frac{2}{3}$ grain) per kilogramme ($2\frac{1}{2}$ pounds) of the animal is given, it is usually fatal to the cat, which becomes more and more excited, has violent convulsions, and dies in a state of tetanic rigidity; (6) contrary to what is observed in animals which morphine calms, the young subjects are less sensitive to it than the old ones, and in all the animals of this species in which morphine is constantly excitant it is an excellent adjuvant to anaesthetics.

THE COCAINE HABIT.

Hallopeau,⁶⁷ reports several cases of acute cocainism, from the study of which he has reached the following conclusions: that a single injection of cocaine hydrochlorate may give rise not only to accidents of an immediately grave character, but also to prolonged and exceedingly painful disorders. They consist of persistent headache, profound malaise, insomnia, trembling of the extremities, vertigo, and much cerebral excitation, characterized by loquacity and much agitation. Small doses of the drug may be sufficient to produce these symptoms, which may continue for several months. These effects are observed chiefly in subjects who have a very excitable nervous system, and may be attributed to an elective action of the poison for certain nerve-centres. Magitot, in reporting Hallopeau's work to the French Academy, formulates the following rules for the administration of cocaine in surgery: The dose of cocaine should be proportional to the extent of surface to be anaesthetized. It should never exceed, in any case, 0.08 or 0.10 gramme ($1\frac{1}{4}$ to $1\frac{1}{2}$ grains); these large doses are to be reserved for extensive operations. Cocaine is never to be employed where cardiac or respiratory disease exists, or upon neurotic subjects. Its introduction into the veins should be avoided, and the injection should be given with the patient in a reclining posture. The cocaine must be of absolute purity. A small portion should be first injected, and the effects observed for several minutes to see if toxic symptoms follow. Employed according to this graduated method, it has great advantages over chloroform and ether, and the duration of the anaesthetic effects is

always sufficient to permit almost all of the ordinary operations to be made.

Ball²⁴ _{Feb. 15} reports a case of mixed addiction (morphine and cocaine). The patient acquired the morphine habit from its use for the treatment of sciatica; after five years, he acquired the cocaine habit through injections for the relief of dental neuralgia. The doses were gradually increased, until a gramme (15½ grains) of cocaine and nearly the same quantity of morphine were used daily. In proportion as the habit became confirmed his health rapidly deteriorated, appetite and muscular power diminished, sight became feeble, hallucinations of hearing developed, and a dread of persecution by the police took possession of him; and, finally, he became insane. San Martin⁶³² _{June 22} reports the case of a diabetic female who suffered from severe pruritus vulvæ, which was relieved by an ointment containing cocaine. The effect was so agreeable that the patient continued to make the application from four to six times a day. After a few days she began to exhibit the symptoms of acute cocainism, consisting of insomnia, extreme mental excitement with hallucinations, the sensation of impending death, rapid and irregular pulse, and sighing respiration. The symptoms subsided after the drug was discontinued.

Levin⁴¹ _{Jan. 1} reports a case of chronic cocainism. The patient suffered from hallucinations, under the influence of which, according to his statement, he twice committed assaults. Levin regarded it a case of cocaine epilepsy, on account of the suddenness of his attacks of furor and a certain amount of amnesia. Those who discussed the case, however, were inclined to attribute his mental derangement to the patient's hereditary predisposition and former intemperate habits, rather than entirely to cocaine. He formed the habit by using it for a nasal trouble.

THE TOBACCO HABIT.

Chapman⁵⁶⁸ _{Nov.} has published a paper on "The Toxic Effects of Tobacco-Vapor, with a Report of Cases." He says: "Tobacco-stemmeries have a process by which they get dry tobacco in a proper condition for stemming. This is done by means of a number of reservoirs containing steam generated from pure water, which is turned on the tobacco, previously arranged so as to receive and retain the necessary amount of moisture. When

ready, this is carried to the men who do the stemming. The carriers are usually children from 9 to 15 years of age. Knowing, then, that the vapor of tobacco contains numerous basic substances of the picolinic series and several fatty acids, and probably nicotine and nicotianine, the latter, from its volatile character, being, probably, the most effective, it can be readily seen how the systems of these children become saturated with these poisons. Usually their presence is manifested, during the first day or two, by violent vomiting, retching, purging, and often a state of collapse, after which the system may become inured to them. Occasionally we find one whose constitution, even by contact and time, although there is a certain amount of toleration, refuses to receive them kindly, and emaciation begins, attended, sooner or later, by other symptoms. Five cases are reported, in which the prominent symptoms were: sudden and severe abdominal pain and tenderness; slight elevation of temperature; rapid, small, wiry, irregular pulse; short, shallow, irregular respiration; contracted pupils; a glaring red and pointed tongue; a dry, cold skin; constipation, scanty urine, emaciated and anæmic appearance. The attacks run a course varying from a few days to several weeks, and recur if the work is persisted in, while permanent recovery follows cessation from work at tobacco.

Kjellberg⁸² makes the remarkable statement that he has observed a form of nicotinic psychosis among the marines and employés in factories at Upsala, who use large quantities of tobacco by chewing. It manifests itself by feebleness, inactivity, and despondent ideas; hallucinations follow at an early period, accompanied by depressive ideas; at a later period, by exalted and maniacal ideas and actions, the disease running on for several months if the tobacco is not discontinued and tonic treatment adopted. Auché¹⁸⁸ relates a case of tobacco-intoxication from the external application of an infusion of tobacco to the entire body for the purpose of destroying pediculi pubis. The infusion was made from 200 grammes (6½ ounces) of tobacco to 2 litres (4 pints) of water, and two applications were made, with thorough friction. Soon after the second application, he began to experience the effects which come to the novice after his first smoke, and finally the most intense toxic effects of tobacco, which lasted for several hours.

Ydan-Pouchkine,⁵⁸⁶ in order to determine the effect of tobacco on digestion, selected 7 healthy persons who were not

smokers, and for a period of three days he examined the gastric juice by prevailing methods: the movement of the stomach by the salol test of Ewald, and the absorptive power—according to Zweifel's method—with potassium iodide. Then, during a second period of three days, each subject smoked 25 cigarettes per day; and examinations were continued for three days longer, without tobacco, to observe the after-effects. He reached the following conclusions: (1) tobacco increases the quantity of the gastric juice, but lessens its acidity; (2) the quantity of free hydrochloric acid is also diminished; (3) as the quantity of the hydrochloric acid is reduced, the digestive power of the gastric juice is diminished; (4) tobacco retards the action of the ferment of the gastric juice; (5) these modifications of the gastric juice continue for a considerable time; (6) the movements of the stomach and its power of absorption are increased by tobacco; (7) tobacco has no influence on the acidity of the urine.

Steaver,⁷⁹ physician and instructor in athletics at Yale University, has made a comparative study of the users and non-users of tobacco, in respect to their physical development. His results in four years' study of a class were as follow: Average increase in lung-capacity in users of tobacco, .15 litre; in non-users, .25 litre; or an increase of 66 per cent. greater for non-users. Inflated chest-measurements: in users, .304 metre; non-users, .0364 metre; or an increase of 19 per cent. greater in non-users. Height, in users, .0169 metre; non-users, .0202 metre; or an increase of 20 per cent. greater for non-users. Weight, in users, .4 kilogramme (1 pound); non-users, .5 kilogramme (1½ pounds); or an increase of 25 per cent. greater for non-users. Of the entire class, 70 per cent. have not used tobacco. The prominent athletes, with one exception, do not use tobacco, and all candidates for the crew abstain from tobacco.

The French Academy of Medicine has been seeking after the causes of the small increase in population in France, as compared with other countries, and a variety of supposed factors have been considered, in this relation,—such as diminution in the number of marriages, voluntary limitation in the number of children, the right of primogeniture, the celibacy of priests, abortions, syphilis, and alcoholism. Now Decroix⁸⁰ comes forward with what he considers one of the chief causes of the so-called “Depopulation of

France," namely, the use of tobacco. He bases his opinion chiefly on the following fallacious statistical methods: Of 10,000 inhabitants, in provinces where the largest quantity of tobacco is smoked, the ratio of births to deaths is 38.40 to 2.55, and where the least quantity is smoked 43.33 to 1.81. In the ten provinces where smoking was most practiced there was an excess of deaths, while there was only 1 with an excess in the 10 where there was the least amount of smoking. The average amount of tobacco consumed by each inhabitant was 1377 grammes (2 $\frac{1}{4}$ pounds) in the former provinces and only 321 grammes ($\frac{3}{5}$ pound) in the latter; in the ten most nicotinized provinces the excess of births in 10,000 inhabitants was 34, while in the other it was 43. He recommends the enactment of a law prohibiting those under sixteen years of age from smoking in the streets or public institutions, similar to the New York State law. Bremmer,⁸² in a paper on "Tobacco and Insanity," takes the view that the tobacco habit may be a factor in the production of insanity and in aggravating an existing mental derangement. This, he thinks, is shown by the improvement which he has seen follow the abandonment of the habit. His assertions are not supported by detailed cases. A series of editorials⁸² ~~Aug. 1881~~ on some of the baneful effects of tobacco upon the human system, contain an array of statistics and arguments pertaining to the evil effects of tobacco, but without original details.

ALCOHOLIC INEBRIETY.

The articles upon the different phases of this subject during the year present few new facts or modifying arguments. On the great topics of intemperance and methods of lessening the evil all shades of opinion are represented, as they are every year; presented with slight changes in language, but without an essential change of ideas. Owing to the prominence of the individuals and the extreme views they have taken, rather than to anything else, the public have been somewhat agitated over the utterances, on the one hand, of Tolstoi²⁰⁸ in favor of total abstinence from alcohol and tobacco, and, on the other, of Mortimer Granville²⁸ upon the evils of total abstinence. The expressions of the latter have called forth a storm of criticism from the total abstainers and temperance advocates throughout England, while the essay of the former has drawn out expressions of opinion from a number of prominent

French writers. The only idea in Tolstoi's article which has any claim to originality is the exaggerated opinion that "the habit of taking stimulants in large or small quantity, either periodically or irregular, among both the high and the low classes of society, proceeds from the same cause, namely, the necessity of stifling the conscience that the flagrant discord which exists between modern life and the exigencies of conscience may not be observed." Tolstoi's psychology is of the purely metaphysical sort. Had he possessed the rudiments of physiological psychology he would hardly have taken the superficial view leading to the error of mistaking a frequent secondary effect for its essential and primary cause. Charcot's,²⁵ comments on the subject are characteristic. He writes: "I am compelled to admit that I do not find the article of Tolstoi very able. It is exaggerated and, therefore, false. Alcohol and tobacco are injurious, but they can be used in moderation. There are numerous examples of this. Moreover, before alcohol and tobacco there came into the world abominable things. Indeed, since their introduction, civilization has rather softened. Must one say, then, that tobacco and alcohol are moral forces? In everything I hate extreme positions. I believe in common sense, and I do not see that the position of Tolstoi conforms to its dictates."

At the other extreme we find Mortimer Granville's²⁶ views, who says: "Drunkenness is in no other sense the consequence of drinking than the destruction of a house by fire is the consequence of having a cooking-range on the premises. The moment appears opportune for a little plain speaking, and I trust that this may be permitted, not only to those who seek to convince the public mind that alcohol, in all its forms, is needless to the healthy and of only questionable value to the sick, but to those who hold that it is far better that the healthy should be moderate drinkers than abstainers, and that the great value of alcohol in the treatment, and I will go farther and say in the prevention, of disease should be clearly recognized. I am perfectly well aware that in professing a strong belief that abstinence from the use of wine or beer is a worse evil than the occasional abuse of these intoxicants—I use this form of expression advisedly—I am placing myself in antagonism to the majority of medical writers on this topic; but I am so thoroughly convinced of the accuracy of my view, after forty years' study and observation of the subject, in its professional and social aspects,

that I should be lacking in moral courage if I hesitated to express myself decidedly. I sincerely believe that incalculable harm has been done to the average human organism, with its functions, which we are wont to classify as mental and physical, by the spread of teetotal views and practices. There is less stamina in the life of the average Englishman now than there was forty years ago. He may live a little longer, but he is not so well able to resist the invading germs of disease or to recover from the debilitating effects of such an invasion as he was when good wine and sound ale formed integral parts of his daily diet. He has lost some, if not much, of the practical advantage due to the diminution of preventable maladies by improved sanitation, because he has allowed his organic life to fall a grade lower in vital energy than that which previously protected him against perils greater than those that now beset him. Asylum physicians go around their wards and note that a very large proportion of those who become insane previously drank to excess; but if the bulk of general practitioners, outside asylums, were asked what proportion of those who habitually drink to excess become insane,—which is a very different matter,—the evidence that drink plays any important part in the production of insanity would be found to fall to the ground. I doubt whether, of the great bulk of the general practitioners who have opportunities of collecting information on this subject, any large number could compile 20 cases, falling under their individual observation, of persons who habitually drank freely and became insane. It is nothing to the point to tell us that of insane persons many once drank. We want to know the proportion of persons who 'drink' that are passing into the class of lunatics. So far as I have been able to ascertain, this proportion is so small as to be insignificant. Meanwhile, a calm and careful survey of the statistical and clinical facts will show that not a few terrible diseases, such as consumption, cancer, specific maladies of low type,—for example, diphtheria, the worst forms of gout, nerve troubles, and a host of minor ailments, having for their proximate, if not ultimate, causes those depressed and asthenic conditions of vital force in the organism which render it, as a whole, weak in the presence of its enemies, and, as to its constituent parts, prone to the degradation of organic types of life,—have developed and extended their ravages since the practice of substituting 'table-waters' and watery wines for sound—malt

and hop and grape—fermented beverages has sprung into fashion at the instance of the temperance advocates. These are grave assertions to make, and I am not insensible to the responsibility which attaches to a physician daring to make them; but I am persuaded that the time has come when those who do not share the views it is fashionable to profess ought to declare themselves."

Most of the regular writers on inebriety have contributed their usual quantity. Wright, of Bellefontaine, Ohio,⁹⁸ has presented us with no less than six essays on the subject during the year. We could hardly expect an entire change of ideas in each article on the same general subject, but might, at least, expect some variation in their tenor. The following papers do not require more than mention; not from want of merit, in many cases, but on account of their adding little or nothing to our knowledge of the subject: Watson,¹⁰⁸ Blaine,¹¹⁵ North,⁷⁶⁰ and Ganser¹²³ on the general subject of "Inebriety and its Treatment"; Mason⁶¹, on its "Etiology"; Armand⁷⁶⁰ on "Heredity"; Thwing⁷⁶⁰ on "Climatic Influences in Relation to Inebriety." Thomas¹⁰⁴ has a total abstinence article; Davis¹¹⁰ has delivered an interesting address on the consumption and injurious effects of alcohol. Wilkes' address² before the British Medical Association, on the "Effects of Alcohol," is characterized by moderation in the views expressed. Weisgerber⁸⁷⁹ reviews the "Experiments on the Falsification of Alcoholic Drinks in France." From the clinical side, there are three interesting lectures by Lancereaux¹⁴ on "Hereditary Alcoholism and Absinthism" and on "Alcoholic Delirium." Hancock⁹⁰ reports a case of profuse and fatal haematemesis consequent upon chronic alcoholism. Parker³⁸⁹ reports a case of delirium tremens. Smart⁹⁸ reports a serious case of alcoholic singultus, treated by rectal feeding, morphia injections, and inhalations of chloroform. Baker⁹⁹ relates a case of hereditary dipsomania, in which the patient, during his periods of craving for alcohol, even when he was prevented from obtaining a drop of alcohol, would become sleepless, lose his appetite, appear silly, incoherent, present a staggering gait, blood-shot eyes, and sometimes had delusions. Swain² reports a case of poisoning by "faints," the name given to the latter portions of the distillate obtained by rectifying crude spirits of wine from fermented potatoes, chiefly fusel oil. Latimer,⁷⁶⁴ in reporting cases of alcoholism, said that, since

he had assumed medical charge of the Baltimore City Jail, he had treated, during the period from April 11 to December 31, 1890, 958 cases of alcoholism, of which 40 suffered from acute excitement, or *mania à potu*. The average duration of the mania in each case was forty-eight hours. All of these patients were admitted drunk, and most of them had had previous attacks of delirium tremens. Many of them were also addicted to the use of chloral and opium in addition to alcoholics. Nearly all of the total number had tremor, pains in the head and muscles, loss of appetite, and, frequently, vomiting. The 40 who had mania were usually noisy. As to treatment, he would say that no stimulants were given in any case. The uniform prescription was 30 grains (1.94 grammes) of bromide of potassium every two hours in maniacal cases, and every three or four hours in other cases. In cases of noisy mania, $\frac{1}{4}$ grain (0.016 grammes) of morphia sulphate was occasionally given hypodermatically at bed-time. There were no fatal cases; all recovered. Not only were stimulants withheld, but the food was imperfectly adapted to their needs. In view of these facts, he was disposed to think that alcoholism was not due to a suspension of stimulants, nor to the indisposition to take stimulants. Further, he did not regard the administration of stimulants as necessary to treatment. On the contrary, he was of the opinion that many cases of delirium tremens had a fatal issue in consequence of the administration of stimulants. Glazer,¹⁵⁴ in an extensive series of experiments to determine the effect of alcoholic drinks on the urine, reaches the conclusion that alcohol, even in relatively moderate quantities, irritates the kidneys; so that the exudation of leucocytes and the formation of cylindrical casts may occur. It also produces an unusual amount of uric-acid crystals and oxalates, due to the modified tissue changes produced by the alcohol, or to a diminished solvent action of the urine from alcohol. The effect of a single act of overindulgence in alcohol does not last over thirty-six hours, but it is cumulative under continued use. Lobinger¹⁵⁵ has read a paper on "Changes in the Liver and its Functions in Chronic Alcoholism." Grenier¹⁵⁶ reports the results of his studies upon the children of drunkards, based on 188 observations. They have a decided tendency to commit similar excesses, one-half becoming drunkards. Convulsions during infancy occur in a majority of them. Epilepsy is the most

characteristic neurosis developing from alcoholism in the parents. They furnish a large contingent to the insane population, every form being observed, but alcoholic insanity is more frequent in the children than in the parents. He states that the morbid influence is greatest when one or the other of the parents are drunk at the time of conception.

Carpenter⁸⁵⁶ reports the results of dissection on 19 drunkards, at the Northwestern Medical College. He says: "Twelve out of the 19 suffered with either inflammation of the stomach or bowels, or both. Five out of the 12 suffered with inflammation of the stomach alone, and that to a surprising extent. In 2 or 3 of these cases the mucous membrane of the stomach was black and thickened, and in places ulceration had taken place. Of the other 7, 3 had suffered with both gastritis and enteritis, while the remaining 4 had suffered with extensive inflammation of some part of the intestinal canal; a majority of them suffering with colitis. A remarkable feature in these 12 gastro-intestinal cases was that every one had, at some period of their lives, suffered with pleurisy or pleuro-pneumonia, for pleural adhesion existed in every case. Pitt⁸⁵⁷ has published some notes on the post-mortem appearances in chronic alcoholism. In 30 cases in which phthisis was present, a dense, fibroid, pigmented change was almost invariably present in some portion of the lung, far more frequently than in other cases of phthisis. Gray or yellow tubercles were less common, and caseous broncho-pneumonia was quite the exception. The prevalence of these fibroid, and to a certain extent reparative, changes appeared to be associated with the taking of a large amount of alcohol. *Prima facie*, the chronic dyspepsia and irregular habits, the lack of food, and the gross improvidence and recklessness of these patients would lead one to expect that their mortality from phthisis would be high. The Registrar-General's reports, however, showed that the mortality from phthisis, of publicans and others whose occupations exposed them to special temptations to drink, was rather below than above the average. But acute tuberculosis and pneumonia were very prone to occur in such patients, and the tuberculous nature of the disease might often be overlooked during life. It was noteworthy that about three-fourths of the cases of alcoholic neuritis and about a fifth of those of alcoholic cirrhosis of the liver were found, after death, to

have tuberculous lesions also. The association of such lesions with cirrhosis was seldom insisted upon, but was of importance. Out of 110 cases of alcoholic cirrhosis, in 23 there were tuberculous lesions,—phthisis most commonly,—but, in some, acute tuberculosis or tuberculous peritonitis. Pitt's conclusions were, that tuberculous lesions in the lung in alcoholic subjects generally assumed a fibroid form, and that tuberculous lesions were not infrequently associated with alcoholic neuritis and hepatic cirrhosis.

Elliston,²² in papers on the physiological action of alcoholic beverages, quotes approvingly from Gluzinski's experimental results, in which he says³²⁶: The observations were made on man, both in physiological and pathological conditions of the stomach, the stomach being emptied at stated intervals during digestion and the contents carefully examined. Alcohol disappeared with great rapidity from the stomach, and in all probability passed into the circulation, since no aldehyde is ever found to be present within the stomach. The effect on digestion varied at different times, according as the alcohol still remaining within the stomach had become absorbed into the circulation. During the former stage the digestion of albumen was retarded. On the other hand, after absorption, it stimulated secretion, causing especially a marked increase in the acid secretions of the gastric juice, and thus considerably accelerating the processes of digestion. Nor did the effect terminate with digestion; secretion still continued, and much longer than if no alcohol had been given. At the same time it caused a considerable increase in the quantity of liquids to be found in the stomach. The beneficial effect of small doses of alcohol were thus readily explained, as, also, the deleterious effects of larger ones. It followed, therefore, that if alcohol was to be given at all to assist in digestion it should be administered preferably in small quantities, and, best of all, immediately before meals; any momentary delay in digestion which occurred before its absorption being then of no account, while the increased secretion has already set in by the time the food enters the stomach.

Lambard,²⁰⁸ in giving statistics on the consumption of alcohol, in La Seine-Inférieure, France, states that in 1850 the average consumption of alcohol in France was 1.46 litres (1½ quarts) *per capita*; that it gradually increased until, in 1884, it was 3.98 litres (1 gallon) *per capita*; in the Seine-Inférieure, 13.2 litres (3½ gal-

lons), and at Rouen 16.7 litres (4½ gallons) *per capita*. Wester-gaard, ⁶ in a paper on "Alcoholism," states that, "Whereas, in Denmark there is a small excise on spirits, Norway has a very high one; and, whereas, Copenhagen has an excessive number of publicans,—1 for every 300 of the inhabitants,—the Norwegian capital has only 1 public house for the sale of spirits for every 5000 inhabitants. In Christiania, according to a communication to me from Berner, Inspector of Health, during twenty years only 76 deaths from alcoholism and delirium tremens have taken place,—65 among males, 11 among females; and there is reason to believe that the actual number of deaths from these causes is only slightly higher. Only $\frac{2}{3}$ per cent. of deaths among adult males have been due to these causes, while in Copenhagen the corresponding number was 5 per cent.; and, while the suicides in Christiania were only 2 per cent. of the deaths among adult males, the corresponding figure in Copenhagen was 4 per cent. These facts speak very clearly of the effectiveness of the measures adopted in Norway, which have reduced the quantity of spirits consumed in that country to one-fourth of what it is in Denmark."

The new legislative system in Massachusetts involves the following changes ⁷⁰⁰_{Aug. 8}: 1. The fine as a penalty for drunkenness has been abolished. 2. Imprisonment has been made the only punishment for this offense. 3. Provision has been made for the treatment of drunkards by the courts as individuals and not as a class. 4. The man who is intoxicated occasionally will be taken into custody until he is sober, and will then be released with the knowledge that succeeding similar offenses will be severely punished. 5. Full and complete records will be kept of this class of offenders, making possible the recognition of habitual drunkards. 6. Probation officers, appointed by each court, will investigate all cases, and take the surveillance of such persons as the court shall think can be better cared for at liberty than in prison, provision being made for surrendering for sentence those upon whom the experiment of probation fails. 7. Provision has been made for hospital treatment of those who have become dipsomaniacs.

The American Medical Temperance Association ⁶¹, makes the following announcement of its purpose, through its presiding officer, N. S. Davis, of Chicago: "The object of this association is to advance the practice of total abstinence in and through the medical

profession, and to promote investigation as to the action of alcohol in health and disease, and it aims at being a bond of union among medical abstainers scattered all over our country. It admits as members regular medical practitioners who are practical abstainers from all alcoholic liquors as beverages. Members are not required to sign any pledge, but if such, for any reason, cease to become total abstainers, it is expected that they will withdraw from the association. The liberty of members to prescribe alcohol is entirely uncontrolled."

Crothers,⁶¹ in a paper on "The Relation of Life-Insurance to Inebriety," makes the following recommendations: 1. The moderate or excessive user of spirits, who can pass a good physical examination, should be given a policy on some basis proportional to the length of time he has drank and the extent of his drinking. Comparative accurate tables of mortality could be formulated on these cases, which would fairly represent the probable duration of life. This would necessitate an accurate study of a large number of such cases, the conclusions of which would be of the greatest value to both science and the companies. 2. Policy-holders, previously temperate, who become inebriates, should be the object of personal solicitude by the medical examiners, and required to use all rational means for recovery. Failure and neglect on the part of the friends to use ordinary means for restoration should be the only reason for annulling the policy. This would also require accurate medical examination of such cases, and reveal lines of causes and conditions of disease which would enlarge the bounds of science, and bring a degree of accuracy where doubt and confusion exists at present.

Ergolski⁵⁸⁶ _{Nov. 10} praises very highly the use of strychnia in all forms of alcoholism, believing that cures may be effected with it. Kahlbaum⁸⁴ _{July 11} reiterates his former views in favor of isolated towns or colonies for alcoholics, wherein the usual avocations of life may be carried on.

The Earl of Meath²⁴ _{Dec. 16} has lately returned from a visit to the Scandinavian peninsula, where a fair measure of success has crowned temperance legislation. He reports that the "maximum of good to the community has already been effected with the minimum of inconvenience to all classes." The system known by the name of the "Gothenburg system" was first experimented with, but it was attended with so much friction and ill-will that it soon

gave place to other methods, one of which is the municipal "trading-society" licensing method.

The municipal council decrees the number of licenses that is equal to the reasonable requirements of the population. A monopoly is then given to a society formed by the trading community, and for a definite term of years. The council retains full control of the operations of the society. No private person is allowed to retail spirituous liquors. The retailing of beer and wine is permitted under a special license. A certain proportion of the profits is applied to pay the share-holders of the society their preferential interest, after which the surplus must be assigned to charitable societies and institutions. Last year there were 50 of these societies in operation. In nearly all of these localities the same general restrictions exist as to hours of sale and persons who may buy; all licensed houses must shut down from 8 P.M. on Saturday until 8 A.M. on Monday, and no person under 16 years of age may be served with alcoholic drink, no person under intoxication may be served, and no female bartenders are permitted. The society of the city of Bergen, in Norway, has been enabled to show a net profit of fully 125 per cent., which is an indirect gain to the public, in its charitable work and in the repression of inebriety, that is found to be incalculable. Brawls and wounds and deaths by violence have been reduced, while the resources for the hospital treatment of the deserving poor have been increased.

So much has appeared in the public press concerning the so-called "Keeley Cure for Drunkenness," the methods employed, and the alleged successes in a large number of cases, that the subject is a familiar one to both lay and professional reader, and demands some notice in a review on inebriety. The medical literature of the year, however, contains little of importance on the subject. The few editorials and brief comments by correspondents consist, on the one hand, of mere guesses as to what drugs are used in the treatment; and, on the other hand, of imprecations against Keeley for maintaining secrecy concerning the nature of this vaunted cure. The article in the *North American Review*, from the pen of Col. John F. Mines (Felix Oldboy), announcing his complete recovery and the general success of the methods, was followed so soon by his relapse to inebriety and death from alcoholism that it has furnished facts for those who

decry the "Keeley Cure." Gregg¹⁹ thinks that, "as it is a secret preparation, we have a right to guess at its composition." He guesses that "it consists in part of a 4-per-cent. solution of hydrochlorate of cocaine, with $\frac{1}{4}$ grain of hydrochlorate of morphia and $\frac{1}{8}$ grain of terchloride of gold and sodium in every 10 drops of the cocaine solution." Other physicians have guessed that "atropine was one of the drugs used." Randall²⁰ and others believe that the chief factor in the success of the "Keeley Cure" is *suggestion*, and that the regimen and medicinal treatment is based on that idea. If this view is correct, and it is the only plausible theory yet offered, those who insist that Keeley should publish the secret of his alleged discovery to the world, and in not doing so is to be classed as a charlatan, must admit that an explanation would ruin his influence and destroy his success; by such an act the knave would be converted into the fool. The profession has shown good sense in saying so little on this subject while so few actual facts were in our possession.

LEGAL MEDICINE AND TOXICOLOGY.

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MEDICAL EXPERT TESTIMONY.

REFORM in the methods of using medical men as experts is a plant of slow growth. Suggestions and recommendations are offered in sufficient number, and there the matter ends. English and American courts continue to follow traditional usages, and show no willingness to find a better way. Each of the parties to a suit in litigation secures the services of medical witnesses favorable to him, and leaves the witnesses to justify their testimony as well as they can; this is in accordance with the theoretical right of every person to call on behalf of his defense such witnesses as he sees fit. Judge Cullen,¹⁵⁷ discussing this subject before a Brooklyn medical society, declared that it is useless to hope for any legislation which will limit the character of the expert witnesses to those who may be named by the court or picked out by any society.

Meanwhile, this is precisely what medical men continue to hope for and to ask for. The Denver Medico-Legal Society, ⁹_{Dec. 20, '90} through a committee appointed to consider the subject, formulated this demand in the following terms:—

“ 1. That it is the sense of this Society that its Committee on Legislation should endeavor to have a law enacted at the approaching session of the State Legislature empowering and requiring the judge, before whom a case necessitating medical expert testimony is to be tried, to select one or more medical experts, the number depending upon the importance of the case, the wishes of the attorneys for both sides, and upon the approval of the presiding judge.

“ 2. That the Board of Physicians so selected by the court be required to examine the claimant or defendant jointly as a Board, and that other physicians selected by the attorneys for either side

be permitted to be present and participate in the examinations and discussions of the Board.

“3. That the physicians selected by the court be required to testify in court concerning their examination, and submit to cross-examination as is now the custom.

“4. That a definite expert fee be allowed by the court and paid by the county for each of the physicians selected by the judge.”

A bill designed to meet and remedy existing difficulties was presented to the Pennsylvania Legislature,¹¹² but “failed for want of time.” In this bill the design was to ascertain by a medical commission, and to report to the court, an unbiased statement of the facts relative to any claimant’s physical condition, leaving prognostic and other opinions aside. It provided:—

“1. That in any suit where the question of the mental capacity or the physical condition of, or extent, character, or effect of injuries sustained by any person or persons may be in controversy, the court in which such suit is pending shall, upon the application of either of the parties to such suit, appoint one or more medical experts, who shall, after being duly sworn or affirmed to discharge their duty with fidelity, and after notice to the parties, make full examination of such person or persons, and make report thereon in writing to the court, which report shall be filed with the record of the suit, and may, so far as relevant, be read as evidence at the trial, subject to the right of either party to call such medical expert or experts for examination-in-chief or for cross-examination.

“2. That if any such person or persons shall refuse to submit to examination by such expert or experts, the court shall make such order, where the refusing person is a plaintiff, for the entering of a non-suit.

“3. That the fee of each of such experts shall be fixed by such court, but shall not be less than ten dollars nor more than one hundred dollars, and shall be taxed as part of the costs of the case.”

Clark Bell⁷⁰⁰ urges, as one measure of relief, the creation of an official, to be known as the National Chemist, in the service of the government, with a salary sufficient to command the highest available talent, and the establishment of a thoroughly equipped

laboratory, which should be at the disposal of the government or persons accused of crime, or of the State authorities, under suitable regulations; this, he thinks, would be a measure that would reflect credit upon the nation, greatly assist the authorities in the administration of justice, and elevate the character and standing of expert testimony in the courts.

He declares, also, that the best interests of the people of the various States of the Union would be greatly subserved by creating in each State an official, to be known as the State Chemist, with sufficient salary to insure high skill in the discharge of official duty, and by establishing a competent and thoroughly equipped chemical laboratory; the duty of the State Chemist being to act as well for the State and public authorities as for all accused persons in all criminal trials, at the expense of the State.

The year, though barren of accomplished results in the matter of reform in the use of medical experts, has furnished one conspicuous example illustrating in the highest degree the aid which medical science may bring to the solution of difficult problems in criminal jurisprudence. One case like the following, demonstrating the power of genuine experts before a jury, is worth more than many resolutions and legislative bills in establishing an ideal standard of what such testimony ought to be ^{July 11} :—

About 10 A.M., April 24, 1891, the dead body of an intemperate and dissolute woman was found in a bed-room in a low resort in New York City. She had taken the room late the previous night, and had occupied it with a man, who had disappeared, and was not suspected of any connection with her death. The real culprit, upon whom the crime was fixed, was an Algerian vagabond, who had come to the hotel alone, and had taken a room near that in which the woman's body was discovered. What transpired during the night, before the murder, was not demonstrable by evidence. In general terms, the theory of the prosecution was that the prisoner had taken Room 33 for the purpose of entering other rooms during the night and gratifying his passions with women whom he might find alone; that he had entered Room 31 at some time during the night, and had found Carrie Brown after her male companion had left her; that in some way he had become enraged at the woman, had taken her by the throat and strangled her; that the mutilation, etc., were evidences

of a certain ferocity of temperament not to be wondered at in a person of his character and previous record; and that, after having murdered the woman, he had returned to Room 33, and had left the hotel as soon as practicable, without attracting particular attention, in the morning. It was in corroboration of this theory that the medical evidence became of the highest value, and, as the verdict indicated, was of controlling importance.

The body of the woman was found in bed; a small, red shawl and a petticoat, both blood-stained, were wound around the head. The lower region of the abdomen was slashed open, and several inches of the lower part of the ileum were cut out completely and left in or near the body. Other parts of the ileum were cut open, and one ovary was pulled out. The stomach and large intestine were not injured. An ordinary case-knife, broken and sharpened to a point and stained with blood, was found near the body. The bed-ticking under the body was soaked with blood. Three or four spots of blood were found in the hall between Room 31 and Room 33. A spot of blood, as large as a dollar, was found on the bed, and a spot of about the same size on a wooden chair in Room 33. Bloody finger-marks were found by the side of the door of Room 33, and on the wall near the door.

It was in evidence that the murdered woman had said to a female acquaintance, on the afternoon of April 23d, that she had eaten nothing for several days. On that afternoon she took a glass of beer and a cheese sandwich, and some corned beef, raw cabbage, and pickle from a "free-lunch" counter.

The cause of death was determined by the autopsy to have been strangulation, and the expert medical evidence was directed mainly to the establishment of the identity of the murderer and to fixing the crime upon him. The prisoner was arrested the night after the murder. His shirt and both socks were stained with blood. The largest stain on the shirt was on the front flap. There were smaller stains on the right sleeve, the left sleeve, and the back. Four days after the arrest matters were taken from beneath the finger-nails of the prisoner. The testimony which the microscope gave concerning these stains and nail-deposits convicted him. The microscopic examinations were conducted by Cyrus Edson, H. F. Formad, and Austin Flint; but it is to the

latter that chief credit is due, for conclusions based on purely scientific foundations. The examination of various stains on the clothing of the prisoner, on that of the woman, on other surfaces in the two hotel-rooms, established that they were stains of mammalian blood. In other specimens—viz., matters under the prisoner's nails, front flap and right sleeve of shirt, wall-paper from hall, wood from door, casing of door, chair, socks of prisoner, knife found in Room 31, bed-ticking and sheet from Room 31—blood was found, with more or less admixture of the following: (1) biliary coloring matter unchanged; (2) fat-globules and crystals; (3) tyrosine; (4) cholesterol; (5) triple phosphates; (6) columnar epithelium; (7) eggs of round-worms; (8) starch granules; (9) partially digested muscular tissue, with a few fibres perfect, and partially digested vegetable matters; (10) "molecular detritus."

It was erroneously stated to Flint that the large intestine was the part of the intestinal tract that had been mutilated after the murder.

"Notwithstanding this statement," writes Flint, "and a general impression that the specimens represented blood mixed with faeces, I formed and expressed to Edson and Formad the decided opinion that the blood was mixed with the contents of the lower part of the ileum. My grounds for this opinion were the presence of tyrosine and bilirubin, which do not exist in the normal faeces, and incidentally the presence of a few very slightly altered muscular fibres, such as probably would not be found in the large intestine. After re-examination of the specimens and consultation, we all agreed that the matters mixed with the blood came from the small intestine; and a record of the autopsy, received later, showed that a portion of the lower part of the ileum had been cut out, the large intestine being uninjured. I emphasize this point for the reason that the case actually turned upon the distinction between the contents of the ileum and the faeces. Whatever credit may be attached to the originating of this theory must carry with it a very large share of the responsibility of the conviction of the prisoner; for it was the general opinion, at least of those connected with the prosecution, that this was the fatal point against the prisoner, as faeces, especially in persons of filthy habits, might have been derived from sources other than those alleged.

"On the witness-stand I testified substantially to the following facts and conclusions:—

"1. That the specimens examined by me contained tyrosine, bilirubin, columnar epithelium, partially digested muscular tissue and vegetable substances, micro-organisms, etc.

"2. That the tyrosine and bilirubin must have come from the small intestine, while the other substances might exist in the large intestine.

"3. That the tyrosine was due to the prolonged action of the pancreatic juice upon albuminoids, these matters being first converted into trypsin-peptones and afterward into tyrosine, the change into tyrosine being aided by the action of intestinal micro-organisms.

"4. That the bilirubin, which strongly colored the epithelial cells and the molecular matters, was characteristic of the contents of the small intestine.

"5. That the appearances were practically the same in all the specimens.

"My opinion that the matters were from the small intestine was based mainly on the presence of tyrosine and bilirubin.

"I further testified that, after matters passed from the small into the large intestine, tyrosine ($C_9H_{11}NO_3$) was changed into indol (C_8H_7N), and that bilirubin ($C_{32}H_{36}N_4O_8$) was changed into hydrobilirubin or stercobilin ($C_{32}H_{40}N_4O_7$) and became of a brown color; that the recognized matters peculiar to the faeces were indol, skatol (to which the peculiar odorous matters adhere), phenol, stercorin, excretine, and excretoleic acid."

Judging from the verdict, the jury believed that the blood was mixed with the contents of the small intestine, and not with faeces, and that the matters found on the prisoner's person and clothing were identical with those found on the ticking of the bed on which the murdered woman lay.

SEXUAL INCAPACITY; STERILITY.

Generative Ability after Castration.—Massazza⁸⁸⁹ reaches the following conclusions, as the result of some experimental researches undertaken in the laboratory of legal medicine at the University of Pavia: 1. Castration does not immediately deprive an animal of *potentia coëundi*. 2. One can find, for some time after removal

of the testicles, normal spermatozoa in the efferent ducts and in the seminal vesicles. 3. These spermatozoa do not always retain their fecundating power. 4. Only those zoösperms are fertile which preserve their characteristic movements, or which can recover those movements by a special treatment. 5. If one finds in the liquid withdrawn from the efferent ducts or the seminal vesicles zoösperms with the body detached from the tail, he may conclude that all the spermatic filaments are dead. 6. The fecundating power of zoösperms found in the seminal passages of animals castrated does not continue more than nine days after the operation. 7. If one applies to the human subject the results demonstrated in animals, one may conclude that the activity of the zoösperms continues a short time only, and does not extend beyond the ninth day after castration. 8. As it is probable that a man who has just been mutilated by castration will hardly feel capable of sexual intercourse during the nine days which follow the operation, the reproductive potency of men who have been deprived of both testicles may be absolutely denied with confidence.

Is Sterility a "Disease?"—Mr. Justice Holmes, of Dublin,⁵⁴⁷ has made a decree that sterility is not "sickness" within the legal sense. A suit was instituted by a Dublin physician to recover fees to the amount of nineteen guineas for attendance upon the wife of a solicitor. The lady, it appeared, suffered from no other disease save sterility, but anxiously desired a cure for this condition, and sought advice with this object, whether with or without the knowledge and consent of her husband was not clearly proved. The physician attended and made many examinations, by speculum and sundry applications of sponge-tents and other instruments, for the purpose of dilating the cervix uteri. The lady's husband refused to pay, on the ground that the treatment of his wife for the cure of sterility was not a "necessary" for which the law required him to pay, and on the additional ground that the physician's attendance took place without his knowledge or consent. The law laid down by Mr. Justice Holmes, in his charge to the jury, is as follows: "1. Every man is bound to provide necessary medical care for his wife in case of sickness. 2. Every husband is liable for payment of fees in case of such sickness, whether he knows of the attendance on his wife or not; but, 3. Sterility is not a sickness for the treatment of which a husband can be made liable. It does

not shorten life, nor prevent the carrying out of household duties, nor cause physical pain. Therefore, medical attendance for the remedy of such condition is not a 'necessary' within the meaning of the law, and the physician, in this suit, could not recover the fees due to him. It should be added, however, that he could still recover against the separate estate of the wife, if she had any, for 'work and labor done,' though the 'work and labor' might not be legally 'necessary,' as against the husband."

PREGNANCY AND DELIVERY; ABORTION; INFANTICIDE.

Precipitate Child-birth.—Laugier reported the following case to the Paris Société de Médecine Légale ^{Dec. 10, '70}: The woman was a multipara, eight months advanced in pregnancy. She felt a sudden desire to go to stool just after taking an injection. At the moment of sitting down on the water-closet seat she gave birth to a foetus, which dropped into the space below, a distance of about half a metre. The funis was immediately tied, and the child was rescued. The woman declared that she felt no pain whatever at the moment of the passage of the child, and that she was wholly unconscious of what came from her. The reporter suggests that if she had had her accident under other circumstances, if the child in falling from her had broken the navel-cord and had passed into a vault below, the question whether or not there had been an intentional infanticide would have been an exceedingly difficult one to answer.

Air-Embolism.—Hektoen ⁷⁷⁹ contributes an interesting addition to the limited series of cases illustrating instantaneous death from the entrance of air into the circulation through ruptured uterine veins. The patient was a woman of 19 years, married seven weeks before her death, but pregnant in the fourth month. She was in good health, except that she had occasional attacks of headache and vomiting. She went into her room, in apparent perfect health, for the alleged purpose of changing her dress; after being in the room about ten minutes the noise of a fall was heard, and she seemed to be groaning. Her husband at once entered the room, and found her lying on the floor with her head against the wall; beside her was a Davidson syringe, a chamber-vessel, and a basin of cold water, all arranged in such a way as to suggest that she either had commenced or was intending to take a vaginal douche.

Her husband immediately placed her on the bed, and then he found that she was dead. All this took place in, at the longest, ten to twelve minutes.

Examination twenty-four hours after death: Inspection showed the body to be well formed and well nourished, with no external marks of any kind; there was firm cadaveric rigidity; no signs of decomposition at all, but some lividity of the dependent parts of the body. There was no hymen; there were no tears or bruises about the vulva or perineum, and no blood or fluid of any kind in the vagina.

On opening the body all the great cavities were found empty, and the serous membranes lining them smooth and shining. The uterus was enlarged, filling the true pelvis. The subperitoneal vessels of the small intestine contained short columns of blood, separated by clear, apparently empty spaces; pressure on the vessels would move their contents *in toto*, indicating that the apparently empty spaces contained some kind of gaseous contents. The same condition was found in the coronary vessels, which contained even more air. The heart *in situ* seemed about normal in size; the left ventricle was quite firmly contracted; palpation of the right ventricle, which was distended, gave the sensation of squeezing a rubber ball but partly filled with air. On incising the right ventricle, which was done while the heart was still *in situ*, black, frothy blood oozed out in considerable quantity, many quite large bubbles bursting on reaching the surface of the foaming mass; entangled in the columnæ carneæ of the wall of the ventricle were semi-solid clots, on incision of which cavities containing air became apparent. In the right auricle was a much smaller quantity of blood, quite frothy from intimate admixture with air. The left ventricle and auricle were quite empty. The endocardium and the heart-muscles showed no changes. The lungs were oedematous and congested.

The uterus was about as large as a good-sized cocoa-nut; its serous surface was reddish-gray in color, and quite smooth. It was opened along the middle of the posterior surface,—from the centre of the cervical os clear to the fundus; by so doing, the placenta, which was situated on the posterior wall, was exactly bisected. The cervical canal was $1\frac{1}{2}$ inches long, and contained a mass of clear, viscid mucus, not mixed with blood. The cavity of

the body of the uterus contained about 2 or 3 ounces of fluid blood, a foetus, and the placenta. The foetus was 7 inches long; it weighed 4 ounces. The placenta was $2\frac{1}{2}$ inches in diameter,—situated on the posterior wall; at its inferior margin a commencing separation from the wall of the uterus had taken place to the extent of about three-fourths of an inch along the entire lower border. Beneath this separation were seen the openings of many uterine sinuses. In the left ovary was a *corpus luteum* of pregnancy. There were no air-bubbles found in the veins of the broad ligaments, nor in the *vena cava*, nor in the pulmonary arteries. The kidneys, liver, spleen, stomach, and intestines were healthy. The brain and its membranes showed no macroscopical changes, the sinuses and veins containing, perhaps, more blood than usual.

The great accumulation of air in the right ventricle and auricle, the total absence of disease and decomposition in all the organs, the patulous uterine sinuses beneath the partial placental separation, made the diagnosis of death from air-embolism evident, the air entering the uterine sinuses.

Infanticide.—Coutagne, of Lyons, ^{Sept. 15} reports the following extraordinary case of rupture of the spleen in connection with an infanticide. A woman, 29 years old, was delivered of a living child on the 17th of September; on the 27th of the same month she threw the child from a wharf, intending that it should be drowned in the river below. It was killed by striking upon the edge of the stone wharf-pier, which had arrested its fall. The autopsy discovered some head injuries; but the most important lesion was a rupture of the spleen. In the abdominal cavity there were 150 grammes ($4\frac{1}{2}$ ounces) of blood. The splenic region was the centre of a collection of large clots. The spleen was of normal consistence and color; it weighed 17 grammes ($4\frac{1}{2}$ drachms); on its outer surface, at about the middle, were three large, transverse rents, joined by a fourth vertical fissure; two of these lesions involved the entire thickness of the organ, extending through to the capsule on the inner surface. There was a subcutaneous ecchymosis the size of a small pea, but no other injury of the left hypochondrium. The ribs were intact.

The supposition that the injury was caused by a direct blow over the spleen seems to Coutagne to be supported and demonstrated by the small size of the organ, its mobility, and its protection

under an osseous covering which in infancy is endowed with special elasticity.

RAPE.

The Medico-Legal Value of the Gonococcus. — Kratter¹⁴⁷ reports a number of cases of vulvo-vaginitis in girls, where a positive diagnosis could only be made after finding the micro-organism in the discharges. He says that without a bacteriological examination it cannot be determined whether or not a vaginal discharge (after rape) is traumatic or idiopathic, and that the detection of gonococci in such a discharge is proof of the presence of gonorrhœa, which has probably been conveyed in the sexual act. If the result of such examination be negative it does not, however, justify one in absolutely excluding gonorrhœa, as there are cases of undoubted gonorrhœa in which few gonococci are found, and only after repeated examinations.

On the other hand, Vibert and Bordas²⁴ have convinced themselves, by a course of experimental researches, that, at present, it is premature to give much diagnostic value to micro-organisms found in vaginal and vulvar muco-purulent discharges. They made careful observations upon the genital discharges of six little girls, upon each of whom a criminal assault had been committed by men found to be absolutely free from any trace of gonorrhœa. In the vulvar discharge, in each instance, there were discovered diplococci which, morphologically and bacteriologically, differed in no respect from the micro-organism said to be pathognomonic of blennorrhagia. In size and shape, in their habitat and arrangement, in their behavior under staining processes and on different culture media, the diplococci found by these observers were not to be distinguished from the gonococci of Neisser.

In these views, Bovet²⁸ coincides, his conclusions being the result of independent studies upon some cases of idiopathic vulvitis originating without the slightest suspicion of any impure contact or indecent assault.

SUDDEN DEATHS AND THEIR CAUSES.

The experience of a coroner in a great city like London affords opportunity for collecting data to show in what directions dangers to human life lie the thickest. Wynn Westcott,² a deputy coroner for a district in the midst of London, which sup-

plies an average of 30 inquests each week, has classified and studied the deaths which may properly be described as sudden in their character, selecting for his purpose the latest series of 1000 inquests occurring under his authority. Of the 1000 deaths upon which inquests were held there were 303 which might be properly called sudden, unexpected, and natural in cause. Of these 303 cases there were 185 males and 118 females; and of these 303 the medical witnesses affirmed that in 88 of them, or in 29 per cent., the death was either directly or indirectly attributed to excessive use of alcoholic liquors; of the 185 males, 57 were alcoholic; of the 118 females, 31 alcoholic; that is, alcoholic excess caused almost one-third of the male deaths and more than one-fourth of the female deaths, or, more accurately, 30.8 per cent. of the men and 26.27 per cent. of the women died suddenly, unexpectedly, and without warning, from the effects of intemperance, in addition to the very large number who died during the same period of slower but no less surely fatal alcoholic poisoning.

Using the conventional classification of the causes of death, the author distributed the 303 deaths in his list thus:—

1. Syncope,	210 cases.
2. Coma,	64 cases.
3. Asphyxia,	29 cases.

Coma.—The 64 deaths due to coma were described either as due to excess of serum on the brain or effusion of blood; in a few cases congestion of the brain was alone detected at the post-mortem examination. Of these cases, 20 were described as occurring either during a fit of intoxication or as mainly due to alcoholic excess; of these 20, 10 were women. The majority of these apoplexies seemed to form a climax to a gradually-increasing career of ineptitude, while a few of them were the results of almost a single gross debauch.

Asphyxia.—The 29 cases grouped as caused by asphyxia were of miscellaneous character; 8 persons died in convulsions, apparently epileptic; 1 man died suffocated in a very sudden acute attack of œdema of the glottis from laryngeal catarrh; 1 from pleuritic effusion; 4 died suffocated during the spasms of asthma; 1 person died suffocated when dead-drunk; 3 were gradually suffocated during the fogs; and 13 died unexpectedly and suddenly, and were subsequently found to be suffering from various stages

of pneumonia and bronchitis. Three of the epileptics were confirmed drinkers, as were the men who died of oedema, and 2 of those who died in the fogs.

Syncope.—The 210 cases of syncope admit of the most extended study; 15 followed rupture of aneurisms of the aorta; 2, rupture of the ventricles of the heart; 1, rupture of the right auricle; 20 were described as caused by diseases of the cardiac valves, and 3 by dilatation without obvious valvular disease. In 77 cases, post-mortem examinations showed fatty degeneration of the muscular substance of the heart; these were all described as weak hearts, but 18 others were described as weak and flabby hearts without fatty degeneration obvious to the naked eye; in 1 case a cyst was found in the cardiac walls; 10 were assigned to senile decay of the heart and great vessels. External haemorrhage accounted for 15 cases of syncope; there being 10 who died suddenly from haemoptysis, chiefly phthisical patients; 3 cases of haematemesis, all alcoholic patients; and 2 died from uterine bleeding; 2 cases were referred to embolism, 1 of them following inflammation of a vein in the leg; 2 cases happened in sufferers from angina pectoris or cardiac neuralgia, 1 in a patient whose heart's action was embarrassed by a large ovarian tumor; 3 cases of syncope followed perforations of the stomach and bowel, due to ulceration; 2 cases occurred in the course of delirium tremens; 1 died fainting from sun-stroke; 3 deaths occurred, during the debility of chronic Bright's disease, on attempting slight exertion.

Determining Causes of Death by Syncope.—The secondary or determining causes are a matter of great interest, showing us what dangers need to be avoided by those whose circulatory organs are defective. One man died while playing lawn-tennis with the champion player; 1 died in a Turkish bath; 1 case of fatal fainting was assigned to oversuckling, acting on a weak heart; 5 occurred during attempts at defecation; 13 cases of fatal syncope were due to unusual exertion, such as going up-stairs, getting into cabs, and digging; 5 were due to shock and excitement, and 1 to anger, acting on a weak heart. One lady, who was both aged and weak, was asserted to have died from the want of an accustomed night draught of hot gin-and-water on a very cold night last winter. One man and 1 woman fainted and died during the act of sexual intercourse. Six persons died of syncope while suf-

fering from want and destitution—almost all in the streets of London. In 5 of the cases of weak and fatty heart, the determining cause of death was said to be overdistension of the stomach. There was one very curious case, apparently of syncope from shock or fright,—a patient in an asylum fainted and died when attempting to strangle herself with a towel attached to the bedstead; the neck had not actually been subjected to any pressure.

Alcohol and Syncope.—Of the 210 deaths by syncope, there was clear evidence of the excessive use of alcohol in 57 cases; that is, in between 27 and 28 per cent. Of the 77 cases in which fatty degeneration of the muscular tissue was observed, no fewer than 33 were chronic inebriates, or 43 per cent.

DEATH BY BURNING; SPONTANEOUS COMBUSTION.

Appearances Observed in Human Bodies After Death by Burning.—Sir William Jenner⁶ contributes a valuable addition to our knowledge of this subject in an article giving an analysis of the data of seventeen deaths occurring in burning buildings. One of the main conclusions reached is a refutation of the popular idea that the process of burning to death is, in most cases, an extremely painful one. He declares that, although the bodies examined may show signs of burning during life, in the form of hyperæmia and vesication, it should be remembered that insensibility by suffocation probably supervened, partially or completely, some time before the skin surrendered its vital reaction to heat. The extreme and prolonged rigidity generally found in the bodies of those “burned to death” is a phenomenon which the author explains as due to the action of heat superadded to cadaveric spasm. In the cases reported by Sir William Jenner, the cause of death was found mainly to have been the toxic effect of carbonic oxide, resulting from the slow combustion taking place in the burning building; in some instances, carbon dioxide seemed to be the chief lethal agent. Besides these two gaseous products entering into the cause of death, other factors were recognized; for example, the inhalation of solid carbonaceous matter, acting as a powerful irritant to the air-passages, and, again, the mechanical effects of the fire and heat upon the surface of the body.

The fluidity of the blood after death from exposure to fire is explained by Sir William Jenner as being due to the action

of heat, preventing coagulation. To this there should unquestionably be added the influence of carbonic oxide in the same direction; it is a common observation, after poisoning by the inhalation of carbon monoxide, that the blood is not only of a bright, cherry-red color, but that it is also very fluid.

Spontaneous Combustion of the Human Body (Empresmus).

—Reynolds⁹⁰ discusses this subject, in all its bearings, in an instructive paper, introducing a case under his observation. He states that the term spontaneous combustion, taken in its literal sense, means the burning of a material mass, independently of contact with or near approximation to any burning body. This is well known to occur with such substances as closely-packed cotton or hay, but, in the case of the human body (when it is also called empresmus), such a definition would exclude almost every authentic reported case. In fact, it is better to define spontaneous combustion of the human body as merely an increased combustibility, since it is generally understood that a human body will not, even after being well lighted, go on burning independently.

The cases of so-called spontaneous combustion may be divided into five groups: (1) hysterical; (2) spurious; (3) true spontaneous combustion without approximation or application of any burning material; (4) increased combustibility; (5) homicidal cases of burning. Setting aside the first three classes in this list as either incredible, inaccurate, or fraudulent, the author remarks of the fourth group that the cases recorded of increased combustibility of the human body are comparatively numerous, and are mostly trustworthy. By this increased combustibility is meant that a human body in certain cases will, after having been *well lighted* by some neighboring burning substance, go on burning independently, just as a candle will. It is more than probable that all cases of so-called spontaneous combustion (putting aside the hysterical and homicidal) belong to this group. The chief facts relating to 40 analyzed cases are stated as follows²⁰⁰⁴: (1) the proportion of females to males was about 4 to 1; (2) the parties were mostly of a very advanced age, chiefly from 50 to 80, rarely 50; (3) their habits were most frequently sedentary and inactive; (4) they were, in almost every instance, stout or very fat; (5) almost all had been for years addicted to the excessive use of spirituous liquors; (6) the combustion almost always immediately followed such excesses;

(7) it always happened in the night-time and in winter; (8) calls for assistance were never heard from the parties; (9) in the majority of cases, though not in all, there was some burning body in the vicinity; (10) the combustion was excessively rapid, occupying mostly but a few minutes, sometimes only a few seconds; (11) it was attended with flame, and hardly admitted of being extinguished by water—in fact, the first application of water seemed often to increase the flames; (12) even very inflammable objects in the person's vicinity often escaped injury from it; (13 and 14) in every instance the combustion involved part of the trunk of the body, and, with few exceptions, this part was always converted into carbon and ashes; (15) in the majority of cases, portions of the head and limbs escaped the action of fire; (16) the extremities were also severed at the joints, and were covered with vesications; (17) the combustion had always a fatal termination; (18) the charcoal which was left mostly retained the form of the part burned, was very porous, and fell into powder on the slightest touch; (19) the ashes were almost constantly intermingled with a yellowish, oily, glutinous liquid, which also covered the floor, and gave out a penetrating, empyreumatic odor; (20) the whole chamber was filled with a black smoke, and the walls and furniture were invested with a dark soot.

To the rather limited series of reported cases of this class, the writer contributes the following:—

“February 9, 1891, I was directed by the Coroner of the City of Manchester to make a post-mortem examination on the body of a woman, M. M. She was about 35 years of age, married, and had been subject for some years to bronchitis. She had been a constant drinker for the last two years, being drunk and more or less incapable every night; whether she habitually took spirits, wine, or beer, I could not ascertain. As a result of her drunken habits, she had constant altercations with her husband, a sober man, and used frequently to beat him. At the inquest her husband, J. M., stated that he got home on Friday night, February 6, and found his wife getting the supper ready. She had then had some drink, but knew what she was doing. They got supper together, sharing one pint of beer. He then went to bed, and left his wife sitting at the supper-table, opposite the fire, the fender being removed from the hearth. He awoke about 7 A.M. on Sat-

urday and found that his wife had not been in bed, and, on going down-stairs, he found the kitchen-door shut. He opened it and found the kitchen full of a dense smoke, the table overturned, and his wife lying across the hearth, burning, and apparently dead; the table and hearth-rug were also burning. He rushed at once for some neighbors, who returned with a policeman, and the woman was found to be dead. He further stated that the fire in the grate was getting low when he went to bed.

"The neighbor, J. Y., sister of the deceased, said that she was called in, and found M. M. lying on the hearth with her feet before the fire, which was quite low,—only, in fact, a few red-hot cinders. The body and clothes were in flames, and the rocking-chair on which the deceased had been sitting, together with the table, were also burning; the body was quite stiff. Further inquiries made by myself showed that there were no spirits in the house that could be found; that there was no paraffin-oil in the house, gas being used; that the deceased had been a frail woman, and was not fat; that when found the body itself was actually burning with a 'sizzling noise' and in flames, three buckets of water being required to put the fire out. The table was overturned onto the side in such a way as to form a screen between the centre of the room and the woman.

"I made the post-mortem examination fifty-eight hours after death. On entering the kitchen a horrid spectacle presented itself. The room smelted strongly of fire and of burnt flesh; but, as the house was a dirty one, it was impossible to say how much of the dirt present on the walls and ceiling was due to a sooty deposit. The table had been replaced against the wall, had a 'flap' in front unsupported by legs, and was easily overturned by pressure on the top of the flap. The upper surface of the table was charred to the extent of about one-eighth of an inch. The chair on which deceased had been sitting was lying near the hearth, one of the legs having been burnt through. The grate was about a quarter full of cold cinders. The floor near the hearth was slightly charred. Besides the above, no other article in the room was burnt. On the hearth, about two feet from the fire, I found the dead body, lying on the right side. The clothes were almost burnt away. Both arms were extended over the head, the elbows and fingers semi-flexed. The thighs and knees were well flexed, and rigor mortis

was still present in all parts. The hair and back of the head were untouched; the stockings and boots were unburnt, the former reaching up to about two inches below the knee, the flesh covered by the stockings being untouched; the hands were also unburnt. The back was well scorched, and the arms, particularly in the upper parts, were burnt and blistered, but not blackened; the face was crimson from the fire, but unblistered. The mouth I could not open, owing to the rigor mortis. The rest of the front of the body—that is, from the top of the sternum to one inch below the knees—was extremely burnt, as follows: The skin and subcutaneous tissue of the chest were brownish black and quite leathery, like the skin of a piece of smoked bacon. The abdominal wall was charred completely, and there was a large hole about eight inches long in the middle line. Through this, at the upper part, the stomach protruded like a large bladder; its walls were thickened, hard, and charred, and there was a hole about three-quarters of an inch in diameter burnt through, by which the contents had escaped onto the hearth. Through the lower part of the hole in the abdominal wall the greater part of the small intestine protruded, forming a hard and dry cooked mass. The whole of the vulva and upper parts of the thighs were burnt away, the depth of the burning being more and more extensive as the middle of the thigh was reached, where the whole of the muscles were burnt away, and the thigh-bones were lying exposed as far as the knee-joint and completely carbonized. The knee-joints were both freely open, the burning ceasing abruptly, as has been stated, about one inch below the knee. Internally the pelvic organs were normal; the liver and remaining abdominal muscles were practically cooked; the chest-wall showed only a slight covering of fat, and the muscles were cooked, and cut like cold roast mutton. The heart and coronary arteries were healthy in all parts. The lungs were oedematous, congested, and showed signs of bronchitis. The membranes of the brain were markedly thickened, as in chronic alcoholism; the brain was congested, smelt slightly of alcohol, but otherwise was quite normal; the basal arteries were normal. The cause of death was thus evidently due to burns, and there was nothing to show definitely how the woman had caught fire. What had happened, in my opinion, was this: The woman had had more alcohol than her husband knew of. After he had gone to bed she passed

into a state of alcoholic coma, leaned heavily on the front of the rickety table, and fell onto the hearth, upsetting the table at the same time. Her clothes must thus have caught fire, and, when once set alight, they had gone on burning until the body was set on fire, and this had continued to burn slowly on its own account, like a candle, until the morning, when she was found. The fall or burning had evidently never wakened her, as she had made no attempt to move from the spot, and had not attempted to put out the fire, as her hands were unburnt. That the burns were ante-mortem, or else had occurred immediately after death, was evident from the surrounding inflammation and blistering."

In considering the pathology and causation of the cases of increased combustibility, the author inquires whether it is possible to easily burn an ordinary dead body to the same extent as in the case reported; and also whether an ordinary body, having been once well lighted, will go on burning independently, like a candle. The answer to both these questions must be given in the negative. Numerous cases are on record where murderers have tried to destroy the bodies of their victims, but with very partial success.

The most common explanation of increased combustibility is that of Dupuytren. He denies that alcohol has anything to do with the case, except by first rendering the patient stupid and insensible. He explains all the cases by the presence of fat. He says: "I do not know a single example of spontaneous combustion in a lean and dry individual; all were, without exception, extremely fat. . . . When the fire gains the clothes, it burns the skin, which cracks and allows the fat to run out. Part of this flows down on the floor; the rest serves to support the combustion, and with free access to air everything is burnt." All the cases, however, are not extremely fat; although, even in the exceptional instances, the most consumed parts were those regions of the body where fat accumulates most,—that is, in the chest and abdominal walls and in the thighs.

Finally, as to the question of alcohol. It certainly seems at first sight to be a most important factor in the causation, as almost all (if not quite all) reported cases were old alcoholics. It was at first supposed that it was the alcohol deposited in the tissues which took fire and burned. This, however, is probably not so, for flesh soaked in alcohol will, according to Beveridge, only burn

with a bluish flame, which goes out as soon as the alcohol is consumed. Alcohol can, of course, aid increased combustibility in several ways. First, it can thoroughly stupefy the patient, who thus, when he gets on fire, allows himself to burn and roast without taking any heed. Also, it must not be forgotten that chronic alcoholism favors the deposit of fat, and so increases the liability to increased combustibility. Is there also a third factor? Can there be any truth in the old theory that in certain persons chronic alcoholism leads to a deposit of something in the tissues which renders them highly inflammable? The rarity—in fact, almost the non-existence—of such increased combustibility in any but old alcoholics leads one to think that there must be some truth in this view; but what the inflammable substance is, or where it is deposited, is a complete mystery.

TOXICOLOGY.

Hyoscin.—Adler^{4, 25} reports the following case: A practical chemist used as a drinking-glass a beaker which contained some hydrochloride of hyoscin. There was a bitter after-taste, and in a quarter of an hour he felt giddy, and within two hours had become quite unconscious. He lay in deep coma,—the head bent backward, the jaws firmly closed; all the limbs showed clonic cramps; the face was pale; the pupils were extremely dilated, the margin of the iris being only about a millimetre wide, and rigid; the pulse 145, small and soft; the mouth was very dry. The stomach was first washed out, and hyoscin was found in the contents; then 2 centigrammes ($\frac{1}{3}$ grain) of morphine were hypodermatically injected, followed by half the quantity of pilocarpine hydrochlorate. He now made slight movements on being shaken. After three hours the pulse was lowered in frequency to 104, and the tongue was moist. The pilocarpine was repeated, and in two hours he was able to answer a question; after this he had a long, tranquil sleep of about twelve hours. On waking, the pupils were still dilated as much as ever, but the patient soon recovered.

Potassium Chlorate.—The toxic effects of this salt are so rarely observed that the following observation by Fackler⁵³ is of interest: The patient was a healthy lad of 15 years, who had taken 150 grains (10 grammes) of chlorate of potassium within six hours, in a saturated aqueous solution, as a domestic remedy for pharyn-

gitis. The most striking feature was a slight bluish discoloration of the skin, especially marked about the lips, nose, ears, and extremities. Slight jaundice of the conjunctiva was observed. Respiration was superficial and somewhat accelerated. Examination of the lungs gave evidence of no pathological condition of this organ. Pulse was normal in rate; valvular sounds clear; area of cardiac dullness normal; tongue coated; mucous membrane of the mouth slightly hyperæmic; tonsils swollen and reddened, with clean surface; abdominal walls not distended, but painful upon pressure; spleen apparently slightly enlarged, but impossible to definitely determine on account of great pain upon palpation; liver decidedly enlarged.

While the examination was in progress, the patient began to complain of severe pain in the epigastric region, and vomiting ensued. Excruciating pain in the lumbar region followed, and the patient lay moaning, retching, vomiting, and, with the peculiarly discolored skin, presented a rather harrowing picture. Hot applications to the back and abdomen afforded some relief. Urine was voided with difficulty, and sparingly; it was of a peculiar yellowish-red color, and was found to contain albumen. Four hours later slight dyspnœa was present, and a number of yellowish-brown maculæ were seen upon the side of the abdomen, the back, and anterior portion of the neck.

Upon the following morning the condition of the patient was found to be greatly improved. The cyanotic hue had disappeared, and this was accompanied by a more pronounced appearance of the maculæ. A slight icteric hue was present on the skin over the entire body. The urine was still scanty, and of a dark-brown color. The patient had complained continually during the night of pain in the abdomen and lumbar region. The symptoms gradually improved, and within five days had entirely disappeared, with the exception of slight pain in the epigastrium.

Carbonic Monoxide.—Cramer⁸⁵⁴ records the microscopic changes wrought in the brain by carbonic-oxide poisoning. A healthy woman, aged 71, after exposure during a night to carbonic oxide, presented the usual symptoms of poisoning by that gas, as a result of which she died, after an illness of thirty days. The examination of the brain gave the following results: In the cortex an extensively diffused atrophy of medullated fibres had taken

place, together with changes in the ganglionic cells. Some of the smaller arteries in the basal ganglia, in the pons Varolii, and in the medulla oblongata showed thickening and increased transparency of their walls. The neuroglia of the white matter of the brain and of a small spot in the roof of the aqueduct of Sylvius had undergone cellular proliferation, numerous spindle cells being present. In Cramer's opinion, all these abnormal appearances were to be attributed to the poisonous gas, and special interest attached to them, inasmuch as the coarser lesions, which are generally present in similar cases (for example, extravasations of blood, softening) were absent. Moreover, the condition observed was suggestive from a clinical point of view. The change in the nerve-fibres and cells might account for the dementia that often supervened. The presence of the spindle cells might eventually lead to sclerosis, while the changes in the walls of the blood-vessels corresponded in situation with the cerebral haemorrhages that have so frequently been observed.

R. Hoffmann ²⁹⁷ _{April 18, 1881; July 22} ⁵⁵ adds another case to the list of recoveries from carbonic-oxide poisoning (illuminating-gas inhalation) by the use of nitro-glycerin subcutaneously. The patient was a woman 30 years old, who was found apparently dead, after exposure to illuminating gas. Her face was pale; her extremities were cold; her mouth was filled with froth. The cornea was insensible. The pulse was scarcely perceptible, and was intermittent; the respiration was slow and superficial. Hypodermatic injections of ether having no effect to stimulate the patient, Hoffmann injected under the skin, in the praecordial region, 1 milligramme ($\frac{1}{4}$ grain) of nitro-glycerin. In half a minute the pulse had gained in strength; respiration was deeper; the patient moaned; the cornea reacted to the touch. In half an hour the patient opened her eyes, and presently fell into a deep sleep. The pulse was now full and regular, and the patient made a progressive recovery. Some nausea and dizziness remained a few hours.

Nitro-benzol.—Thompson ² _{April 11} places on record a case of poisoning by the inhalation of the vapor of this substance. A man employed at works for the manufacture of explosives was engaged for several hours in pouring nitro-benzol from large drums into smaller vessels. The effects of this exposure and the primary symptoms for which he sought medical aid were dizziness and

headache. He had vomited once or twice, and staggered in his gait. His respiration was hurried (about 36), and the breath was heavy, with the peculiar sweetish fragrance of nitro-benzol. The surface of the skin was of a dark-purple hue, especially marked on the mucous membrane of the lips and beneath the finger-nails. The heart's action was very rapid and tumultuous (160 to the minute), but the pulse was full and of good quality. The pupils were sluggish. There was some tendency to coma when at rest, and the friends of the patient were therefore directed to keep him moving about, with the object of insuring a more rapid respiration, as it was plain that much of the poison was being eliminated by the lungs. Physical examination of the chest failed to reveal any pulmonary congestion. The urine was very dark, smelt strongly of nitro-benzol, and contained neither blood nor albumen. The treatment adopted was simply expectant, and was mainly directed to keeping the patient alive while assisting the lungs and the kidneys in the elimination of the poison. After four or five days the patient made a good recovery, but at this date, though no longer working with the same substance, he still retained a peculiar complexion, as if the blood had undergone some change from which it had not yet completely recovered.

Carbolic Acid.—Czygan¹¹⁶ reports a case of poisoning in a child by concentrated carbolic acid, with recovery. The patient, a child of 7 years, sick with diphtheria, swallowed by mistake a small spoonful of liquefied carbolic acid, thinking it to be a harmless acidulated mixture. The error was discovered at once, and the child was made to drink a glass of water. Almost immediately insensibility followed. All the reflexes were abolished. The pulse was rapid (130) and feeble; the respiration was not hurried, but was noisy. By means of an improvised stomach-tube, lavage was practiced; the fluid first withdrawn had a strong odor of the acid. The patient's condition continuing to be alarming, a hypodermatic injection of 5 milligrammes ($\frac{1}{2}$ grain) of apomorphia was given, without success in producing emesis. A stomach-tube was again passed, and the stomach was washed out with 2 litres (quarts) of water. During this operation vomiting occurred and the pupils reacted. Stimulants were then energetically applied with successful results; the child began to show consciousness and soon fell asleep. The first urine passed was of a greenish

color, without albumen. The next day it was still somewhat green, and gave the reactions of carbolic acid; in another twenty-four hours it was normal. Some pharyngitis remained during the week following the poisoning, and rectal feeding was required. Some of the conditions which favored a fortunate result in this case are thus stated by the author: (1) the child had drunk a cup of cocoa a short time before swallowing the poison; (2) lavage of the stomach was performed promptly; (3) in the course of the diphtheria treatment previously, large doses of alcohol had been used.

Schleicher⁶⁰ records the following observation: A woman in labor swallowed, by mistake, about 40 cubic centimetres (1½ ounces) of a 90-per-cent. solution of carbolic acid. She threw off at once a part of this and drank a little water. At the end of five minutes she became unconscious; collapse was profound, with stertorous breathing. The womb ceased to contract; the child was hastily delivered alive by forceps. Lavage of the stomach was immediately practiced. Uterine haemorrhage was combated by hot-water irrigation and injections of ergotin. The woman slowly regained consciousness and presently vomited. A large quantity of greenish-colored urine was drawn by the catheter. On the sixth day the woman died of pneumonia. The autopsy found very insignificant lesions of the oesophagus and stomach, but well-marked changes in the intestines due to the local action of the acid.

Greenway⁶¹ successfully treated a case in which alarming symptoms followed the ingestion of over an ounce (31 grammes) of a 90-per-cent. solution of carbolic acid. The patient was a woman, aged 21, who took the poison with suicidal purpose. She was found lying on the floor insensible; breathing feebly; with imperceptible pulse; pupils contracted. Apomorphia under the skin in repeated doses failed to excite vomiting. Artificial respiration, with galvanism to the neck and chest, wrought some improvement in the pulse and breathing. The stomach was washed out and warm milk injected. As more than five hours had elapsed since the poison had been taken, recovery seemed hopeless; the features were deathly pallid; breathing slight and feeble; pulse scarcely perceptible; total insensibility and inability to swallow continued. After the repeated hypodermatic use of ether the first signs of

rallying were observable, but more than six hours elapsed from the suicidal attempt before there were any movements of the limbs; this was followed by restlessness and efforts to vomit, and presently by full reaction and convalescence. The following afternoon, about thirty hours after her suicidal attempt, she insisted on going by train to her friends, some twelve miles distant; she walked over a mile to the station, did not experience any untoward symptoms afterward, and in every respect progressed satisfactorily.

Rigby^{6,10} relates the following case: The patient was a woman, aged 19, who swallowed a little over an ounce (30 grammes) of crude carbolic acid for the purpose of suicide. In about ten minutes after she was found in her bed-room unconscious, pale, and breathing with great difficulty; the mouth, lips, and skin about the chin presented whitish, shrunken patches. A strong smell of carbolic acid pervaded the room and stairs. The pulse was distinctly perceptible, but somewhat irregular and jerky. The pupils were very much contracted, and the conjunctivæ totally insensible. There was also tonic spasm of the muscles, more particularly in the arms and about the mouth, so that considerable force was required to straighten the arms, which were flexed, or to open the jaws. No opisthotonus or episthenotonus. After about eight hours of energetic treatment, she still continued insensible, but there was a manifest improvement in both pulse and general appearance. Thirteen hours after taking the acid she recovered consciousness. She now complained of soreness of the mouth and throat, with difficulty and pain on swallowing, and a short, hacking cough. Next day the urine emitted a very foul odor, but not of carbolic acid; it was of a dirty, blackish color, neutral reaction; specific gravity, 1042; no sediment, albumen, or sugar. The microscope revealed nothing. She had passed a good night; the pupils were fairly dilated, and reacted to light; she was rather irritable, but answered rationally; around the mouth and on the neck were brownish discolorations; tongue, throat, and mouth still very sore, and voice husky. From this time she made an uninterrupted recovery.

Mercuric Bichloride.—Eisenhart, of Munich,³¹⁷ Dec. 12, 1900; July 18 describes a case in which a woman, aged 37, was poisoned through drinking, at one draught, a tumblerful of tepid water, in which a 5-per-cent. sublimate pastille had been dissolved. Immediately after drinking

the solution she felt nausea, faintness, and weakness in the knees, so that she could not even crawl into bed. Directly she was placed in bed, violent choking sensations set in, and she vomited bile-stained mucus. One hour and a half after the poison was swallowed, Eisenhart saw her. The symptoms just mentioned had become aggravated. General trembling movements, especially marked in the upper part of the body, were present. The patient could not speak, but by signs expressed that she felt severe pains in the region of the stomach and pharynx, and heaviness in the head. The pulse was rapid and soft, the temperature subnormal, the pupils contracted. She had taken a quart of milk, but found great difficulty in swallowing it. The whites of 3 eggs were given at once, morphine, and, later on, oil of camphor, being injected subcutaneously. The doses of albumen were continued every half-hour during the day. Temporary suppression of urine was noted, but the kidneys acted within twenty-four hours; tea and black coffee favored diuresis, but these fluids were usually vomited shortly after they were swallowed. The symptoms were very grave for several days. The vomiting ceased gradually; profuse salivation and ulcerative stomatitis set in on the third day, with bloody and slimy motions and scanty secretion of urine. Albumen and, occasionally, blood were detected in the urine. It was a fortnight before the patient was able to stand. She had become extremely emaciated, lost a great quantity of hair, and noted that her sight failed her. In about a month the patient was convalescent.

MEDICAL DEMOGRAPHY.

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THE subject of the *depopulation of France* continues to occupy the serious thought of her demographers almost exclusively, and the statistics of the year 1890 has not brought them much comfort.⁶⁷⁰ The year enjoys, in fact, the unenviable distinction of having been, from a statistician's point of view, the worst since the beginning of the century. The following table shows the diminution of marriages and births and the increase in divorces and deaths over the previous year:—

	1889.	1890.	Decrease.	Increase.
Marriages	272,934	269,332	3,602	· · ·
Divorces	4,786	5,457	· · ·	671
Births	880,579	838,059	42,520	· · ·
Deaths	794,933	876,505	· · ·	81,572

For twenty years the death-rate has not been so high, nor for forty years has there been an equally low rate of marriages; and, as to births, there have never been so few reported since 1854, when the Crimean war and the cholera epidemic sufficiently accounted for the low rate that year. When divorce was re-established, in 1884, by Naquet, it was hoped it would become a rare event after the first few years; but the following figures show the contrary to have been the case:—

1884 (4 last months)	1657	divorces	— 6.6	per 10,000	households.
1885	"	4277	"	— 5.7	"
1886	"	2950	"	— 4.0	"
1887	"	3636	"	— 5.0	"
1888	"	4708	"	— 6.1	"
1889	"	4786	"	— 6.2	"
1890	"	5457	"	— 7.0	"

There are some French writers, however, who, while admitting the diminished reproductiveness of that country, claim that

this is not peculiar to it, but is common, in a less degree, to other European nations, as shown by the following table of diminishing birth-rates for seven of the most important of these nations²⁰⁸ :—

YEAR.	France.	England.	Scotland.	Austria.	Hungary.	Germany.	Belgium.	Italy.
1873	26.1	37.8	34.7	39.3	42.0	41.0	33.5	37.5
1874	26.2	37.5	35.0	39.1	42.0	42.1	33.5	36.0
1875	26.0	38.0	35.6	38.8	44.0	43.0	33.7	38.5
1876	26.2	37.5	35.5	38.9	43.7	42.6	34.5	40.5
1877	25.5	38.8	36.0	38.2	43.5	41.8	34.0	38.0
1878	25.2	37.8	35.9	37.8	43.0	40.0	33.2	36.8
1879	25.1	36.7	34.8	38.0	45.0	40.0	33.0	38.6
1880	24.5	36.3	34.2	37.2	43.5	39.5	32.2	34.8
1881	24.2	35.8	33.6	38.0	43.8	39.0	32.8	39.5
1882	24.8	35.3	33.5	38.8	45.0	38.8	33.0	38.2
1883	24.7	33.8	33.0	38.0	44.9	38.5	32.2	38.2
1884	24.6	33.2	33.6	38.6	47.0	38.5	32.1	39.9
1885	24.4	32.6	32.5	37.8	47.0	38.5	31.8	38.8
1886	24.1	32.5	32.4	38.4	47.5	38.4	31.2	37.6
1887	23.7	31.6	31.4	38.8	47.0	38.6	30.9	39.5
1888	23.2	31.0	30.6	38.7	47.0	38.6	30.9	36.4

The decrease is more marked by comparing the mean of the first three years—1873, 1874, and 1875—with that of the last three,—1886, 1887, and 1888:—

	1873 to 1875.	1886 to 1888.	Decrease.
France	26.1	23.7	2.4
England	37.7	31.7	6.0
Scotland	35.1	31.5	3.6
Austria	39.1	38.6	0.5
Hungary	42.7	47.2	+4.5
Germany	42.0	38.5	3.5
Belgium	33.6	31.1	2.5
Italy	37.8	37.8	+0.5

Excepting in Hungary, where the nativity has increased, for some unknown cause, from 43 to 47 per 1000, and in Austria, where, since 1881, the annexation of Bosnia and Herzegovina has notably changed the demographic conditions, and it has risen from 38.2 to 38.7, there has been a perfectly regular decrease of natality of European populations from 1877 to 1888, the extremes of the twelve years having been, in the order of the amount of decrease:—

	1877.	1888.	Decrease.
England	38.8	31.0	7.0
Scotland	36.0	30.6	4.4
Germany	41.8	38.6	3.2
Belgium	34.0	30.9	3.1
France	25.5	23.2	2.3

If the cause of this diminution is voluntary, as is not doubtful, it is significant that the people who are most advanced in civilization have practiced it the most effectively, corruption and civilization thus advancing together.

The protracted discussions of the *Académie de Médecine*, of France, ¹⁰ as to the causes and remedies for the stationary or diminishing character of the French population, were terminated by the adoption, at the meeting of May 5th, of resolutions recommending the establishment of asylums for the reception and care of women during the later months of pregnancy and in their accouchement, providing for absolute secrecy as to the identity and residence of all women received, and for the subsequent aid and protection of mothers unable to care for themselves or their children, and also for the revision of that provision of the law of the 23d of December, 1874, for the protection of infants, relating to hired bringing up (*élèvage mercenaire*), in order that they may not henceforth be deprived of the supervision and care of their parents, when these are possible. Coupled with these resolutions were others, calling for stringent legislation making vaccination and revaccination obligatory, and conferring authority upon municipalities and *préfets* to protect the public health, especially in the matter of the supply of pure drinking-water. Le Fort, ¹⁰ very vigorously insisted that sanitary organizations, that are simply advisory bodies, can accomplish very little practical good without special agents charged with the execution of hygienic requirements, and armed with legal authority to enforce them.

The importance attached by the French Academy of Medicine to the enforcement of sanitary measures as a check to depopulation is notable. Brouardel drew attention to the extent of the preventable drain upon the population by the needlessly abnormal mortality from small-pox and typhoid fever in France, and showed that, while Germany loses only 110 persons annually from small-

pox, France actually suffers the loss of 14,000, and he attributed this difference solely to the rigid manner in which vaccination is enforced in Germany and to the carelessness and indifference of the French authorities in the matter, since statistics show that in 1865, when vaccination was not obligatory in Prussia, the mortality was 27 per 100,000, and that after it was required the death-rate from this cause fell, in 1874, to 3.6 per 100,000, and in 1886 to 0.049, the rate in France at the present time being 43 per 100,000. ^{dear.}

The deaths from typhoid fever alone in France amount to 23,000 per annum, and evidence is abundant that the liability to this disease is in direct proportion to the defective water-supply, and that as this is improved the fever abates. At Vienne the typhoid mortality, which was 200 per 100,000 so long as the inhabitants drank contaminated surface-water, fell to 10 per 100,000 when a pure supply was obtained. At Angoulême the introduction of good drinking-water reduced the proportion of typhoid cases 18 to 0.063. At Amiens, the typhoid mortality of the military population was reduced from 111 per 10,000 to 7 by the establishment of artesian wells. At Rennes, typhoid fever was endemic while the old contaminated surface-wells were depended upon for drinking-water, and fell from 43 per 10,000 to 2 when these were abandoned. The accurate military statistics of the French army shows that typhoid fever is responsible for the death of 1 soldier in 335, or 298 per 100,000 in time of peace. The Tunis expeditionary corps of 20,000 men in 1881 had 4500 cases of typhoid, with 844 deaths, or 4220 per 100,000. Brouardel insisted, therefore, that from 25,000 to 30,000 lives, for the most part of young persons of marriageable age, would be annually saved to France if vaccination and revaccination were made obligatory, and if the towns were everywhere supplied with pure water. The influence of sanitary neglect in tending to depopulate a locality is illustrated by Morlaix in Finistère, which is pre-eminent as the "unhealthiest town in Europe," there having been 616 deaths and only 396 births from January to November, 1890, an excess of 220 deaths over births in 11 months, a rate at which the population would be extinct in less than two centuries were it not for the immigration of country-people.

Among other causes of diminished population in France,

infanticides are increasing in frequency.¹⁰ Comparing the number occurring in 1826 and in 1880 with the population at these dates, we find there were 17 accused of the crime for a million of inhabitants from 1826 to 1830, and 29 for the corresponding length of time from 1876 to 1880. Of 5 infanticides, 4 are committed in the country and 1 in the city, while among 10 individuals 7 belong to the country and 3 to the city.

Among 100 infanticides, 64 are committed by unmarried women, 12 by wives, and 24 by widows. During the discussion as to the advisability of returning to the custom of revolving cylinders for the blind reception of newborn children, or of substituting for it the open-bureau system, Brouardel argued that there was one class of women and girls whom neither plan would deter from abortion or infanticide, the class for whom secrecy after accouchement was more necessary than the concealment of the fact of pregnancy.

The results of the *Canadian Census of April, 1891*, have occasioned very great disappointment in that country,¹¹ the enumerated population of the whole Dominion, 4,823,344, being less than half a million greater than that of 1881, the rate of increase of population during the ten years having been only 11.52 per cent., or but little more than that of England and Wales, which was 11.26. As the natural increase of population during this period by excess of births (35 per 1000) over deaths (22 per 1000) would, at the rate of 13 per 1000, in ten years have exceeded half a million, the immigration into Canada, amounting to 880,000 during the decennial period, must have been more than counterbalanced by a corresponding emigration. The actual rate of increase in population during the last four decennial periods has been: 1851-61, 30.5 per cent.; 1861-71, 9.3 per cent.; 1871-81, 17.3 per cent.; 1881-91, 11.5 per cent. In the maritime provinces alone (Nova Scotia, New Brunswick, and Prince Edward Island) the rate of increase has been about 1 per cent.; in Quebec and Ontario, 9.5 and 9.7, respectively; while in the western group (Manitoba, Assiniboia, Alberta, Saskatchewan, and British Columbia) it has more than doubled, the increase being due in great degree to migration from the other portions of the Dominion.

The *Census of Great Britain* has been almost as disappointing in its developments as that of Canada, and, as in the case of

the United States, the returns of certain localities are claimed to be absolutely untrustworthy. In consequence, the conclusion has been reached that ten years is too long an interval of time between successive enumerations, and though the annual census, advocated by the late Sir Edwin Chadwick, fifty years ago,²² may not be possible on account of the expense, five years, probably, might not be found too long to cause very serious errors based on their results. The discovery that the calculations embodied in the periodical reports of the Registrar-General have been based on largely supposititious data will shake confidence in the reliability of figures and occasion diffidence in accepting the subsequently "corrected" returns. According to Sir Charles A. Cameron, M.D., Medical Officer of Health for Dublin,¹⁰ the recent British census has shown that the population of the great English towns has been overestimated during the period 1881-90, and that consequently their death-rates have been underestimated, while the reverse has been the case in Ireland, the populations of Belfast and Dublin having been underestimated. The estimates of population, in which death-rates have recently been calculated, were in many towns seriously erroneous. The percentage of error in the hypothetical estimate ranged from an excess of 26.3 in Salford to a deficit of 11.9 in Newcastle, and the general error in 28 towns was an excess of 6.5, showing the absolute necessity for a more frequent census than the decennial.

The comparison of the population of the United Kingdom for the decade ending in 1891 with that of the previous ten years shows that, while from 1871 to 1881 it has increased 10.8 per cent., the rate of increase was only 8.2 per cent. for the period from 1881 to 1891, in this agreeing, as before stated, with the data furnished by the other principal European nations. Indeed, taking the total aggregated increase of the populations of Canada, Australia, the United States, New Zealand, France, Germany, Austria, Hungary, and the British Islands, which amounted to 24,596,756 in 1881 and 25,137,320 in 1891, the percentage increase will be observed to have fallen from 13.1 in the former period to 11.8 in the latter.

The recent English census furnishes abundant evidence that, while the rural districts are undergoing depopulation and the urban districts are increasing in the number of their inhabitants,

there is no doubt, as stated by Noel Humphreys at the Royal Statistical Society, June 16, 1891, that the increasing aggregation of population in large towns has markedly diminished. In the 28 largest towns, including London, the rate of increase, which ranged since the first census in 1801 for the first five census periods from 20.8 to 30.7 per cent., fell in the last three decennia from 19.9 [1861-71] to 17.7 [1871-81] and 11.2 [1881-91]. While the population of the area now known as the County of London doubled itself in the forty years from 1801 to 1841, and again in the period 1841-81, it cannot be again doubled in the next forty. The census shows, further, that the density of the population of the older and hitherto most crowded portions of the large towns is declining, to which fact is attributable the diminished death-rate in those central districts in which the mortality has always been the greatest.⁶ In the central district of London, the population has declined at a progressively-increasing rate, this having risen from 5.8 per cent. in the decade 1861-71 to 7.8 per cent. in 1871-81, and to 9.2 per cent. in the last intercensal period. In Liverpool, Birmingham, Leeds, Sheffield, Bristol, Hull, Newcastle-upon-Tyne, Sunderland, Norwich, Brighton, Portsmouth, and Nottingham, the same centrifugal force is in operation, the reduction in the old sub-districts ranging from 9 to 29 per cent.

The Preliminary Census Report⁶ attributes the decline in the rate of growth of the English population to decrease of the excess of births over deaths, in conjunction with increase in excess of emigration over immigration; and it shows, further, that there has been "a persistent decline in the birth-rate," since the mean annual death-rate for 1881-90 was lower than in any previous decennium. The birth-rate, which had risen successively to 34.1 in 1851-60, to 35.2 in 1861-70, and to 35.4 in 1871-80, fell to 32.5 in 1881-90, and has steadily declined each year, without exception, since 1876, when it reached its maximum of 36.3, to 30.3 in 1890, this being due, without doubt, to the marked depression in the marriage-rate. The proportion of persons married in every 1000, which had been 16.9 in 1851-60, 16.6 in 1861-70, and 16.2 in 1871-80, dropped to 14.9 in 1881-90, being considerably lower than in any previous ten years since civil registration was established. The highest marriage-rate was 17.6 per 1000 in 1873, and the lowest 14.1 in 1886. As the decline in birth-rate

is but little greater than that in the marriage-rate, it may be assumed that the decline in the natural increase of population in England and Wales is almost entirely due to decrease in the marriage-rate, which is attributable to the steady rise, in recent years, of the age at which marriage takes place rather than to abstention from marriage.

The *distribution of the sexes* in England and Wales gives 106.4 females to every 100 males.²¹ Widows greatly outnumber widowers, because of the longer existence of women generally and the greater extent to which men succumb to various kinds of accidents. The *Sei-i-Kicai* claims that the excess of females over males, which is the case in many countries of Europe, is gradually decreasing; while in Japan, on the contrary, where, as in Italy, Greece, Turkey, Egypt, Belgium, Servia, and Norway, the men are in excess, the *male ratio* seems decreasing, as proved by the following table²⁰:—

Year.	Male Ratio.						
1874	1.0295	1878	1.0296	1882	1.0275	1886	1.0208
1875	1.0294	1879	1.0291	1883	1.0270	1887	1.0204
1876	1.0287	1880	1.0291	1884	1.0247	1888	1.0209
1877	1.0301	1881	1.0272	1885	1.0239	1889	1.0212

Consanguineous Unions.—The fallacy of the belief that consanguinity is a bar to healthy progeny having been indisputably established,²² it cannot be denied that natural law works for good as well as for evil, so that it must be possible to develop particular physical or moral excellencies by judicious interbreeding; but, although the same laws are in operation and the same brilliant results obtainable, man declines, for some inscrutable reason, as shown by the experiments of the Oneida Community in this direction, to bring to bear upon himself and his race the science which he has acquired in breeding animals.

Louis and Gustave Lancy²³ have collected, in "La Revue de l'École d'anthropologie," some observations on consanguineous unions at Fort Mardick, a little commune near Dunkirk, which was founded in 1670 by the concession of 125 hectares of land, made by Louis XIV to four Picard families, whose descendants now number 1485. They have scrupulously intermarried, the custom, which for two centuries has never been departed from, requiring one of every newly-married couple to be a native.

The authors note the facts that while the natality of all France is only 13 per 1000, that of Fort Mardick is 43, and that, while only 62 infants in 100 over the whole French territory live to reach the legal adult age of 20, at Fort Mardick 74 in 100 attain this period.

From 1882 to 1886 there were 273 unions in this commune, of which 260 had a local origin, and of these 63 were between kinsfolk, chiefly cousins-german and their issue, or 24 per cent. of all marriages; elsewhere in France the average is only 3 per cent. In only two families of married cousins in perfect health did the offspring present any infirmity, and these were both due to accidental causes.

Of the 260 unions referred to, 11 (4.3 per cent.) had only one child and 25 (10.4 per cent.) remained sterile. Of the 11 marriages with only one child, 6 (3 per cent.) belonged to the 197 non-related couples and 5 (7.95 per cent.) to the 63 consanguineous unions. Of the 25 sterile families, 15 (7.5 per cent.) belonged to the 197 non-related couples and 10 (16 per cent.) to the consanguineous unions. In 13.5 per cent. of the sterile marriages the consanguinity was beyond the second degree, and 19.2 per cent. were between cousins-german.

The MM. Lancry conclude (1) that non-renewal of blood renders union sterile, but has no influence on the offspring, and (2) that marriages between relations cause defective products oftener than between strangers, but this is not due to the non-renewal of blood, confirming the common opinion of the day that the advantages and inconveniences of unions between the individuals of a family are such as the good qualities or faults of their begetters make them.

The Population of the Earth.—The recent publication of the "Bevölkerung der Erde" of Drs. Wagner and Supan, by Perthes, of Gotha, gives the most reliable information as to the area and population of the earth now obtainable.² The estimated total of the inhabitants of the globe in the year 1891 is 1480 millions, an increase of 46 millions over the last previous estimate of 1882; but no dependence can be placed upon these figures, as only about half (56 per cent.), 836 millions, have been actually enumerated. The distribution of population is roughly stated, in round numbers and in the order of density, as follows:—

Europe,	857,000,000, or 94 per square mile.
Asia,	825,000,000, or 47 "
Africa,	168,000,000, or 14 "
Oceanica,	7,000,000, or 10 "
America,	121,000,000, or 8 "
Australia,	8,000,000, or 1 "

In Europe, Belgium exceeds all other countries in density of population, with 530 persons to the square mile; next follows Holland with 365, and the United Kingdom with 312; but, whereas in England the density is 480, in Scotland it is only about one-fourth and in Ireland about one-third that of England. In Norway and Finland, the most thinly populated countries in Europe, there are only about 16 inhabitants to the square mile. Of China the estimate is 361 million people, giving a density of about 77 to the square mile.

The *yearly number of deaths throughout the world* may be estimated at 33 millions,^{2003; 9 Nov. 22} or 90,410 deaths per day, 3767 per hour, and 62 per minute. The average duration of life is now computed to be 38 years, one-fourth of mankind dying before 7 years of age and one-half before 17. One person in 10,000 lives to be 100 years old, 1 in 500 to be 90, and 1 in 100 to be 60. The married live longer than the unmarried.

Of 1000 persons who have lived to be 90 years old, 43 were engaged in religious or political pursuits, 33 were artisans, 32 soldiers, 29 lawyers or engineers, 27 professors, and 24 *physicians*.

This accords with the following table of statistics presented by Ogle, in the Section on Demography, at the Seventh International Congress of Hygiene and Demography, at London, August, 1891,^{2 Aug. 16} of the comparative mortality of those engaged in the various occupations in England between 25 and 65 years of age. The death-rate of clergymen, being the best, was taken as the standard:—

Clergymen,	100	Shop-keepers,	158
Gardeners,	108	Woolen-drapers,	159
Farmers,	114	Coal-miners,	160
Agricultural laborers,	126	Shoe-makers,	166
Paper-makers,	129	Commercial travelers,	171
Grocers,	139	Bakers and millers,	172
Fishermen,	143	Upholsterers,	173
Carpenters and joiners,	148	Masons and bricklayers,	174
Lawyers,	152	Blacksmiths,	175
Silk manufacturers,	152	Clerks,	179
Engine- and boiler-makers,	155	Road-laborers,	185

Wool-workers,	186	Painters and plumbers,	216
Gunsmiths,	186	Cutters,	229
Tailors,	189	Brewers,	245
Hatters,	192	Omnibus- and cab-drivers,	267
Printers,	193	Liquor-sellers and inn-keepers,	274
Cotton-workers,	196	File-makers,	300
Physicians,	202	Potters,	314
Quarrymen,	203	Miners,	381
Bookbinders,	210	Street sellers and hucksters,	388
Butchers,	211	Hotel-waiters,	397
Glass-workers,	214		

It is encouraging to learn from Grebenshchikoff^{6 Aug. 8} that the death-rate of Russian medical men is less than that of physicians in other countries, being only 211 out of 12,212, or 17.4 per 1000, annually, the explanation of the difference being found in the fact that the number of medical men under 40 years of age is proportionally greater. Phthisis and infectious disease each constitute about 15 per cent. of the total deaths.

Vital Resistance of Europeans in Tropical Climates.—As missionaries go abroad to save souls among well-fed and well-conditioned aborigines, and leave thousands who are not only in need of salvation, but are suffering the miseries of poverty and disease, to die unshrive, so demographers and climatologists are at work endeavoring to solve the problem how the tropical centres of Africa and Asia may be made safely habitable by European colonists, when the same sanitary injunctions as to water, food, dress, and occupation might, with enormous saving of life and strength, be impressed upon their own neighbors. In the attempt to make these tropical acquisitions safe residences for the money-seeking traders, who are chiefly interested in them, the potency of sanitary precautions in averting morbid climatic influences is necessarily recognized, and these lessons from afar cannot fail in the end to be applied to the same unwholesome agencies which ignorance and indifference allow to be in operation at home. The medical officers of the French army on duty in their foreign colonies are making full and instructive reports on their medical topography, and are accumulating demographic statistics, both of native and foreign residents, of very great value in determining climatological questions.

Gouin, in an interesting article on the climate and demography of Indo-China,^{208 Sept. 19} attempts to reconcile the statement that

this country is only a pestilential marsh, from which one never returns, with the assertion that the climate of Tonquin is as salubrious as that of France. The Annamites of the coast lowlands, notwithstanding the density of the population, which renders the struggle for subsistence so terrible, manifest extreme dread of changing their residence to the interior mountainous and wooded region, where they say the water is green, the air fever-laden, and the foliage so heavy with moisture that it is only necessary to speak aloud to cause the rain to fall. Gouin says, of the four missionary establishments occupying the Tonquin delta, that the Spanish fathers in Central Tonquin, although residing upon the low rice-lands, in consequence of their admirable sanitary *régime*, present the most satisfactory vital statistics, and the French vicariat, in the mountainous region of Western Tonquin, the worst. The sanitary condition of the European troops is less easily studied on account of their frequent changes of residence and irregular employment. As in the case of other European residents of Indo-China, their alimentation is defective in the rejection of the food of the natives, and in the adherence to the bread and wine, which the Frenchman believes to be indispensable to his existence. Gouin says that the Annamite mandarins regard variola as a natural means of restricting overpopulation.

Dr. James B. Thompson, corresponding editor of the *ANNUAL*, in a report on the demography of Siam, calls attention to the lack of physical endurance of the people, unsuited them for the strain incident to change of climate. As compared with the Chinese, they have but little vital force, and succumb to mental effort, disease, or accident more than do other nationalities. The fecundity of the Siamese is good, conception being only retarded by their indulgence in intercourse from childhood, and by the custom of prolonged lactation.

Xavier de Ricard,²⁰⁸ writing of "The Dutch in the Indian Archipelago," calls attention to the rapid increase of the Chinese element in Insulinindia, where there now are 450,000 Chinese to 54,000 Europeans, and in Batavia, the capital of the Archipelago and centre of the Netherland administration, where there are 44,000, with only 7,000 Europeans, the latter number, moreover, including half-breeds.

E. Rivière²⁰⁹ describes at length the ethnological contributions

of François, from the New Hebrides, where the women go clothed with only a little apron of leaves or tufts of grass over the hypogastrium, kept in place by a narrow bark-belt, where the hospitable husbands generously loan their wives for the gift of the smallest piece of tobacco, an exchange of goods to which the wives never object, and where, for the same consideration, a native is usually willing to sell the skull of one of his ancestors. Some of these latter, from the Island of Malicolo, have the elongated deformation caused by the pressure in infancy of the pointed cap, and Mendez⁸²⁰ _{Aug. 10} shows the universality of this practice of deformating the cranium from the times of Hippocrates and Strabo, and of Attila's Huns, to the present time in Roumania, among the Chinooks, and in South America and Oceanica.

Francis Galton, in his presidential address before the International Congress of Hygiene and Demography, ^{2nd 15} says: "It is scarcely possible, as yet, to assure ourselves as to the impossibility of any variety of white men to work, thrive, and continue their race in the broad regions of the tropics. Much more care is taken to select proper varieties of plants and animals for plantation in foreign settlements than to select appropriate types of men. The frequency in history with which one race has supplanted another, over wide geographical areas, is one of the most striking in the evolution of mankind. The denizens of the world at the present day form a very different human stock to that which inhabited it a dozen generations ago, and, doubtless, the same will be true a dozen generations hence."

Stokvis collated the official documents and reports of various Colonial governments in a paper, read before the Tenth International Medical Congress, ²⁰⁰⁰ at Berlin, on the comparative pathology of the human races with reference to the vital resistance of Europeans in tropical climates. It is very significant that the only reliable statistics are those of the medical officers of the Colonial services of Great Britain, France, Portugal, and Holland serving in the tropics, comparing European immigrants with native soldiers, and those of the United States of America, comparing the two dissimilar races, white and black.

The European immigrant in the tropics is assailed by two hostile forces in the shape of tropical-thermal and tropical-infectious agencies, and, in the course of inquiries as to the effects of

the first, Jousset's physiological data of the tropical races—negroes, Hindoos, Annamites, Senegalese, black Antilleans, Cochin Chinese, Malays, etc.—showed the following differences:—

	Europeans.	Tropical Races.
Average respiratory movements per minute,	17 to 18	21 to 23
Vital capacity, c.cm.,	3800	{ 2810 } 3150 3540
Circumference of thorax, cm.,	86 to 95	79 to 89
Pulse-rate per minute,	71	{ 77 } 81 86
Temperature of body,	37.2° C.	37.7° C.

It is not probable that these physiological variations in tropical races are the expression of innate racial peculiarities, but, like the variations of vegetative life and the varieties of animal life, are explicable as effects of increased external temperature, and are such as occur in the inhabitants of temperate regions during the height of summer.

Marestang and Eykman both came to the conclusion that neither high temperature alone nor other meteorological agencies, apart from all other deleterious influences, are certainly able to produce that impoverishment of the blood called "tropical anaemia," the tabulated results of their respective measurements of the average number of red corpuscles per cubic millimetre of blood being as follows:—

MARESTANG	European men newly arrived,	4,916,000
	Residing in tropical regions 5 to 14 months,	5,452,000
	“ “ “ 5 to 13 years,	5,962,000
EYKMAN	Creole—Guadeloupe,	5,183,000
	European men residing in Malaya 2 to 60 days,	5,304,000
	“ “ “ 3 to 12 mos.,	5,260,000
	Natives,	5,328,000 5,200,000

Stokvis does not believe that the tropical European proves inferior to the aboriginal with respect to thermal agencies; he is less susceptible to catching cold than the native, and the mortality statistics of affections of the respiratory organs is greater for the native:—

DEATH-RATE PER ONE THOUSAND.

	European.	Native.
Army of India, 1880 to 1887,	1.18	5.16
Bengal army, 1878 to 1887,	1.89	5.27

While the European suffers more from hepatitis than the native, it must be remembered that the latter is not addicted to the abuse of alcoholic drinks; and it is a fact that the percentage of

deaths from cases treated is more than twice as great with the native than the European.

Stokvis concludes that the variations of physiological life under tropical thermal conditions have little or nothing to do with the question of race, and that the vital resistance of the immigrant European (the European transformed into a permanent high-summer man) is decidedly not smaller, but somewhat greater, than that of the native races.

Respecting the morbific effects of tropical infectious agencies, the experiences of the last decennia are very different from those prior to 1850 to 1860:—

AVERAGE ANNUAL DEATH-RATE PER ONE THOUSAND.

		European Soldiers.	Native Soldiers.
DUTCH EAST INDIA ARMY,	1819 to 1828,	170.0	188.0
	1869 to 1878,	60.4	88.7
	1879 to 1888,	30.6	40.7
BRITISH INDIAN ARMY,	1860 to 1880,	84.6	
	1828 to 1844,	54.09	18.03
	1880 to 1856,	56.7	
	1869 to 1878,	19.3	
	1879 to 1887,	16.27	21.6
BRITISH ARMY, JAMAICA,	1820 to 1836,	121.00	80.0
	1879 to 1887,	11.02	11.62

These changes are not because the races have gained any new properties, or have lost any they had formerly acquired, "but is the blessed consequence of sound sanitary measures." "The fairest laurel practical hygiene may boast of in our days is, doubtless, the laurel she has acquired in ameliorating the sanitary conditions of the European soldier in tropical climates."

The Scotchman, James Lind, in the eighteenth century, said: "Much more than to the climate you are indebted to your own ignorance and negligence for the diseases from which you suffer in tropical climates." The declaration of Hippocrates, that "races are the daughters of climates," is the quintessence of the lesson that modern experience has taught us, and goes to prove the truth of the opinion that the vital resistance of the different races in tropical climates depends more on external conditions than on hereditary racial qualities. Stokvis concludes: "In my opinion the complete acclimatability of strong, healthy, adult Europeans of both sexes in tropical climates must be admitted without any reserve, provided that they assiduously observe all hygienic rules;" and he disputes the allegation that the European is not able to produce, in

tropical regions, more than three or four generations of true European blood, and that from the third or fourth generation onward sterility is the rule.

Felkin,²³ says: "So accustomed is a man to his environment, that it is difficult to remove a European from his home in the temperate region to any other, and yet for him to retain health." He admits that much may be done in the tropics to render a climate more salubrious, and sanitary precautions will do a great deal for the health of the community, but, when all is done, permanent residence for Europeans is out of the question in the low-lying regions of the tropics, and he finds comparatively few areas in the tropics where any great success for European colonization can be prophesied from altitude alone; because, although altitude may give an invigorating climate, there will always be certain elements to detract from its value, viz., the powerful sun, the rarefied air, and the absence of well-marked summer and winter. The influence of altitude on the physiological characteristics is, however, very evident, the residents at high altitudes being strong, robust, buoyant, and of great mental and physical endurance.

Viault, of Bordeaux, announced to the *Académie des Sciences*²⁴ that he had discovered, in the course of his recent scientific mission to the Cordilleras to study the influence of rarefied air on the organisms of living persons, the fact that the phenomenon of the acclimation of man at great altitudes does not come from the increased frequency of respiratory movements, nor the greater activity of the pulmonary circulation, as has been asserted, but from the augmentation of the number of red globules in the blood, these, by means of Malassey's globule-counter, having been found to have risen, in the course of twenty-three days, from an average of 5,000,000 per cubic millimetre to 8,000,000.

Sir William Moore, in a paper entitled "Is Colonization in Central Africa by Europeans Possible?" read before the *Epidemiological Society*,²⁵ maintained that, great as was the power of accommodation possessed by individuals, each race was specially fitted for certain climatic conditions, which tended, sooner or later, to eliminate the unfit, and that admixture with native blood was essential to the permanent existence, in one climate, of immigrants from a diverse one, as illustrated in the instances of the Portuguese in India, and the mixed Spanish and Portuguese races in Central

and South America. He quoted the evidence of numerous travelers as to the unsuitability of even the more temperate regions of Africa; for example, Matabeleland, for European constitutions. Occupation of the country as rulers and traders, as engineers and missionaries, was, he was convinced, the most we could hope to achieve.

Dr. Willoughby contended that the British East African possessions, unlike the fearfully malarious German and the extremely arid Italian territory, were admirably suited for European residents by virtue of their almost English climate and vegetation and the bracing air, and referred to Dr. Lombard's observations on the increase of red blood-cells and of haemoglobin, after prolonged residence at high altitudes, compensating for the rarity of the atmosphere. Colonization, in the sense of the West Indies, where all out-door labor is done by blacks, was certainly possible, since the white population had maintained itself without any admixture for two centuries, and without any appreciable deterioration.

In considering the complicated problems of the relations of climate to health, age is as material a factor as race,⁶ since the young adapt themselves to changed conditions with greater readiness and certainty than the aged.

Shrady⁵⁰ says the perpetual superiority of native inhabitants of the temperate zone is owing to the formative conditions there, which develop the strongest constitutions. This temperate-zone superiority becomes at last a racial peculiarity which time cannot change, and it is not visionary to expect for them, on purely anatomical grounds, the conquest and control of the whole world. Pre-eminent among the vital races stands the complex Anglo-Saxon, who seeks the north pole without fear, penetrates the heart of Africa, and carries commerce into every degree of latitude, regardless of climate. The Scandinavian, Frank, and Teuton possess a similar endurance, and the Slav, Latin, and Turk share it in part.

The *vital resistance of the Jewish race* has recently been a subject of discussion before the French *Académie de Médecine*.¹⁰ By the census of May, 1891, Jews constitute 67,850 souls, or $\frac{1}{567}$ of the total population of France of 39,095,000. M. Lagneau asserted that nervous and mental affections are notably more

frequent among Jews,—physicians in Denmark, Prussia, Hanover, Silesia, Bavaria, Westphalia, and America having placed the excess at from one-fourth to one-half, this being less a racial characteristic than due to their urban life, their commercial occupations, and their cerebrally laborious occupations. M. Worms claims that the statistics of Jewish hospitals in Paris demonstrated the rarity of epilepsy among them, and he denies that the Jewish bent was for an easy life and the pursuit of wealth and comfort, instancing the fact that *l'Annuaire militaire* for 1891 contained the names of 205 Israelites, or $\frac{1}{54}$ of the 25,700 officers of the French army. M. Séé insisted that there was no special pathology for the Jewish race. The recent census of the United States shows that the Jews in that country preserve the peculiarities of their vital statistics in Europe. Their marriage-rate, birth-rate, and death-rate are all lower than those of their neighbors, and their expectation of life better. Their birth-rate appears to be diminishing, owing partly to a diminished fertility of women born in this country, “mothers born in the United States only averaging 3.56 children each, as against 5.24 for those born in Germany, 3.56 for those in Russia and Poland, 5.27 for those in Hungary, and 5.44 for those in Bohemia.”

HISTOLOGY AND MICROSCOPICAL TECHNOLOGY.

By FRANK W. BROWN, M.D.,
DETROIT.

Amœboid Protoplasm.—E. A. Schäfer,²⁰⁰⁵ studying immediately killed blood-cells, notes the contrast between the body of the cell and that of the pseudo-podia. The former shows evidences of structure, granular or reticulated, and takes haematoxylin easily, whilst the latter does not take the stain and shows no apparent structure. Thus it seems that protoplasm is composed of two different substances, differing chemically, as well as physically. These he calls spongioplasm and hyaloplasm,—the former firmer and probably very elastic; the latter, fluid, more active, producing the amœboid movements in the cell. He cites stained, striated muscle-fibre as an example,—the sarcous elements exemplifying spongioplasm, the homogeneous intersubstance hyaloplasm.

Direct Nuclear Division.—H. Hoyer³¹⁶ found the pulmonary sacs of two frogs full of a large number of specimens of *Rhabdonema nigrovenosum*, which he preserved in strong alcohol, afterward staining with borax-carmine, treating and mounting them. The large, polygonal, very granular, but only feebly stained epithelial cells of the enteric canal were seen to show some very remarkable appearances. Most of them contained a single, large, rounded, sharply limited, darkly granulated nucleus, .0014 to .025 millimetres in size. These nuclei were colored intensely red, and each contained a very deeply stained, large, round nucleolus, which was inclosed by an uncolored, relatively broad, clear area; this last is probably an artificial product, due to preservation in alcohol. Various cells of different kinds were found among those just described, and some of these had three to four nuclei of various sizes.

Indirect Fragmentation.—E. Göppert,²⁹ studying the lymphatic sheath of the livers of salamanders and tritons, confirms Arnold's observations as to the division of the nucleus by indirect fragmentation. The nucleus first shows a mesh-work of chromatin.

The chromatin then forms around a ring-like perforation; it then divides into a number of differently sized fragments, though still disposed as a ring. During this process the nucleus retains its membrane, and no cell-division was noticed.

Pathological Mitosis.—Kruse³⁴ studied the indirect subdivision of the nuclei of various carcinomata. He found hyper- as well as hypo- chromatic mitosis, asymmetrical, symmetrical, and multipolar division. In no case were the hypochromatic and asymmetrical figures wanting. This seems to be a confirmation of Hausemann's investigations, and, inasmuch as such figures have only been found in carcinomata, and not in other pathological growths, if substantiated, may prove of great diagnostic value.

Chromatin.—L. Auerbach⁴⁰ finds that "chromatin" includes two kinds of substances, which stain in different ways and react differently to chemicals. The so-called "achromatin" consists, for the most part, of material belonging to one of the two chromatin substances. As one of these has a greater affinity for eosin, fuchsin, etc., while the other has a greater affinity for methyl-green, aniline-blue, etc., Auerbach proposes to call the merythrophil and cyanophil, respectively. In studying these two substances he has been confirmed in his conclusion that the presence of an intra-nuclear net-work is casual and of secondary importance, not a fundamental fact of structure. The net-work sometimes seen is due to a modification of the cyanophil, or less frequently of the erythrophil, or even of both, for a double net-work may occur. The erythrophil resembles the protoplasm of the cell-substance more than the cyanophil does. The latter has amoeboid mobility; it forms the nuclear membrane when that is karyogenic or produced by the nucleus, and not cytogenic or produced by the cell-substance.

History of Blood-Corpuscles.—H. F. Müller²¹⁶ has studied this both in cold-blooded and warm-blooded vertebrates. He finds that the leucocytes and the erythrocytes originate from similar mother-cells. These mother-cells exhibit indirect division, and their daughter-cells undergo various modifications: (1) some become erythrocytes; (2) others are subject to further karyokinesis, but eventually form erythrocytes; (3) others form mono-nuclear resting leucocytes, which grow into resting mother-cells ready to divide; (4) others seem to become the ordinary polymorphic leucocytes. Karyokinesis prevails in the formation of

both erythrocytes and leucocytes; but the occurrence of other modes of division must be admitted.

Leucocytes.—W. Flemming²⁹ B.77, p. 68 recognizes that leucocytes can increase with or without mitosis, but that only the products of the former live on, the latter being degenerations.

Connective Tissue and Inflammation.—Franz Bardenheuer⁷⁸⁸ B.10, H.4 caused a subcutaneous inflammation by injecting turpentine, and attempted to find whether the connective-tissue elements took the same part in the process as the migrated leucocytes. His conclusions were: (1) after two days, subdivision of the connective-tissue elements could be substantiated, and these he considers the only source of regenerative or reparative acts; (2) these elements are morphologically as well as functionally different from the leucocytes; (3) they take up the products of degenerated leucocytes (which are mostly destroyed); (4) that the leucocytes took no part in the formation of connective tissue.

Epithelium and Connective Tissue.—Schuberg³⁴ Aug. 11 concludes, after exhaustive studies on the lower forms, that the under layer of epithelium is joined by a long process with the cells of the underlying connective tissue.

Spermatozoa.—R. L. Maddox,²⁰⁹⁵ in a paper read before the Royal Microscopical Society, confirms the observation that abnormal forms of spermatozoa are not uncommon. Thus, he finds two heads and one filament, two filaments and one head, and in 1 case a spermatozoon with an abnormally-shaped head and three filaments. He does not know whether such a division is perfected in the original cell or in the vesiculæ seminales. As regards the two heads, he prefers to suppose them to originate by two nuclei in the original cell adhering, and furnishing between them but a single filament. He did not find more than two heads with one stalk. In 2 cases he found two heads united to a large, irregularly-shaped body, which appeared to be caused by the swollen, agglutinated filaments of the original spirals.

George Dubern,²³⁹ J.11 studying spermatozoa with moderate powers, but intense light, makes the following observations: The head is composed of a variable number of closely-set spheres, from eight to ten, of which one is larger than the others; and next to it are another two of intermediate size. These being visible on one side, it can be inferred that the whole head is com-

posed of some twenty-five. There does not seem to be more than one large and two medium-sized ones. The tail is composed of thirty-five to forty small spheres.

Origin of the Liver.—T. W. Shore ²⁷⁷ has been led by his investigations to the now recognized view that the liver of invertebrates is not morphologically the same as that of vertebrates. It is the gland of the mid-gut, and when present has essentially the same nature in all; it is composed of caecal pouches, which are lined by secreting epithelium and surrounded by connective-tissue membranes. The liver of vertebrates is made up of a net-work of tubules, interlacing with a net-work of blood-capillaries, and with no basement membrane separating the blood-capillaries from the liver-cells. The liver of invertebrates is essentially a gland, secreting a digestive fluid containing ferments; that of vertebrates is primarily an organ of nutrition for the embryo, and has been adapted to perform similar functions in the adult; in its evolution it is intimately associated with the absorption of the food-yolk of the egg. The pancreas of vertebrates is somewhat similar in structure and function to the mid-gut gland of invertebrates, but we cannot certainly say whether or not the two organs are morphologically equivalent.

Mammary Gland.—Petr. K. Kadkin ²⁰⁵ gives the following conclusions of the histology of the gland during pregnancy and lactation: 1. During pregnancy the interalveolar connective tissue of the mamma proves to contain numbers of leucocytes, which may be also detected between the alveolar epithelial cells, as well as in the alveolar cavity itself and its duct. The leucocytes found in the latter two situations show signs of fatty degeneration of all stages. 2. During lactation leucocytes are met with both in the epithelial lining and alveolar cavities, wherein disintegration of their nuclei supplies the milk with a proportion of its nuclein, the remaining amount of the latter being furnished by the epithelial cells, some of which undergo a peculiar albuminoid degeneration with ultimate destruction of their protoplasm and nuclei. 3. The colostrum and milk-fat is formed in the alveolar epithelium, which undergoes fatty degeneration. In a colostrum mammary gland a certain number of epithelial cells gradually become choked with fat, to be ultimately detached from the alveolar wall, the shed elements being replaced by young ones, which arise

through a karyokinetic or indirect proliferation. During lactation, however, no such destruction of the epithelium is observed, the milk receiving its fat-supply simply through absorbing fatty globules forming about the inner extremity of epithelial cells. 4. Karyokinetic changes in the epithelium of the mammary gland are most pronounced during the second half of pregnancy. They also occur during lactation, but to a much lesser extent. 5. In the absence of lactation, shortly after labor, the epithelial nuclei undergo a degenerative process which resembles Flemming's chromatolysis. 6. The degeneration of the mammary epithelium occurring during lactation, and characterized by the formation of coaguli in the protoplasm and disintegration of chromatin of the nucleus, is most intense in multiparæ (provided each labor was followed by lactation).

Finer Anatomy of Central Nervous System.—Waldeyer ^{4, 866}
No. 22, Sept. gives this *résumé*: 1. The axis-cylinder of all nerve-fibres is connected with a cell, its point of origin. 2. The termination of these cylinders, both central and peripheral, is resolved into a net-work of fibres. Some hold (Golgi) that these anastomose, whilst others (R. y Cajàl, Kölliker, His, Nansen, Retzius) maintain the contrary. 3. Golgi discovered that axis-cylinders may have lateral branches. Cajàl and Kölliker demonstrate them everywhere in the central system, the arrangement being, on entering the cord, each fibre divides in a T-shape,—one going up, the other down. From these, lateral branches are given off at regular intervals, entering the gray substance and breaking up into net-works. 4. A nervous element, then, consists of a nerve-cell; the fibres given off from it, the lateral branches and the net-works. For this element Waldeyer proposes the name "neuron." 5. Golgi thinks that these "neurons" are either long or short, the former connecting the centre with the periphery or distant parts of central organs, the latter joining contiguous points. 6. The nerve-cells show, besides the fibres, a number of protoplasmic processes. Golgi believes their function to be nutritive, while Cajàl attributes nervous functions to them. 7. The neuroglia is composed of two elements,—the ependymal and the glia cells. Both have processes which intermingle, but do not anastomose. It is in doubt if true connective tissue exists in the central nervous system.

New Characteristics of Nerve-Cells.—G. Magini,²¹⁰⁵ who states that the absence of chromatin in the nucleus is a special characteristic of nerve-cells, as compared with neuroglia-cells, advises for the study of this distinguishing feature methylene blue, and also, but less effectively, resorcin and Ehrlich's haematoxylin. Carmine staining is quite useless for the purpose. The objects must be hardened in Kleinenberg's fluid, or in absolute alcohol, or in sublimate. Müller's fluid is not at all suitable.

Michelson²⁰ made a number of experiments which show that the inner surface of the epiglottis is endowed with taste. Schroetter's laryngeal sound, tipped with a solution of quinine or saccharin, was introduced into the larynx, and the drop of the substance was brought into contact with the inner surface of the epiglottis. Positive results were obtained, which were controlled by the sensation—electrical taste—known to be produced by electrical stimulation. It seems, therefore, that a part of the nerve-fibres passing to the larynx are nerves of taste.

INSTRUMENTS, ETC.

Lenses.—It is stated⁵⁹ that an improvement has been recently effected in the manufacture of glass for optical purposes, by means of the addition to the ordinary materials of phosphorus and chlorin, which, in some unexplained way, causes the glass to be very much more transparent, and enables it to receive a higher degree of polish than any optical glass hitherto manufactured. Objects of a diameter of one-eighth millionth of a millimetre are made visible, whereas hitherto an object one-sixteenth thousandth of a millimetre was necessary.

It has been found⁶⁰ that the Koch-Wolzsche lamp, which has already been described in the ANNUAL, can be made more effective by the use of a more powerful light than by the oil-lamp originally used, the latter not being strong enough to overcome the confusion of the red and yellow rays. Schiefferdecker enthusiastically recommends the new arrangement.

Aluminium-Sulphate Cochineal.—The substitution of aluminium sulphate for the alum called for in the formula of Czokor's alum cochineal is a vast improvement.¹⁰⁰⁶ The stain not only becomes more selective, acting almost solely upon the nuclei, but is more prompt and reliable, and the color resulting is more pro-

nounced and agreeable. A similar substitution in other stains using alum is suggested.

Kultschitzky's Nerve-Stain.—J. Schaeffer relates his experience of this method and his improvement thereon. This consisted in removing some of the stain from sections overcolored in acetic haematoxylin, by means of boro-ferri-cyanide of potassium solution. In the previous preparation he prefers chromic acid and its salts; for, the myelin of the medullary nerves having the strongest affinity for these, there is a stage in the washing out when the chromic acid or salt has been removed from all the tissues except the medullary sheaths of the nerves, and this is the moment for staining with haematoxylin.

Staining Medullated Nerve-Fibres.—N. Kultschitzky⁴⁰⁰ gives more complete details of his method for staining sections of the central nervous system. The material to be stained is hardened in Erlitzki's fluid for one or two months, and is then placed in running water for one or two days. It is next hardened in alcohol and imbedded in celloidin. The sections obtained in this way are stained with the haematoxylin solution (1 gramme—15½ grains—haematoxylin, dissolved in a small quantity of alcohol, and 100 grammes—3½ ounces—of 2-per-cent. acetic acid). The staining process requires from one to three hours. After this the sections are placed in a mixture of 100 cubic centimetres (3½ ounces) of saturated solution of lithium carbonate and 10 cubic centimetres (2½ drachms) of 1-per-cent. solution of red prussiate of potash. When sufficiently decolorized (from two to three hours) the sections are thoroughly washed and then mounted in balsam.

Impregnation of Bone with Aniline Dyes.—N. Matschinsky^{316, 400}_{310, 390, 392} finds saturated aqueous solutions of aniline dyes excellent for demonstrating the growth appearance of bone. He found eosin and safranin the most satisfactory. The bones, both macerated and fresh, were sectioned transversely and longitudinally. If fresh, the fat was removed by ether; then the sections were polished, washed, and stained. Macerated bones were placed in the stain for forty-eight hours. The sections were dried, polished, and examined in Canada balsam. Examination showed that the staining was proportionate to the changes going on: in young bone the staining was more pronounced in the subperi-

osteal and subendosteal regions than in adult bones, and much more than in old osseous tissue.

Metallic Impregnation of the Cornea.—F. Tartuferi³¹⁶ says that the fixed cells of the cornea, even to their most delicate prolongations, may be deeply stained by immersing the cornea of some adult animal (ox) in a solution of hyposulphite of soda,—15 grammes (4 drachms) to 100 ($3\frac{3}{8}$ ounces) of distilled water,—for three days or longer, and keeping it at a temperature of about 26° C. (78.9° F.). The preparation is then placed in a vessel containing finely powdered chloride of silver and a little pure water for two days or longer. If the adult cornea be treated in this manner for a still longer period, or if the cornea of a young animal be used, these fixed elements are but imperfectly visible, but other details are brought out; for example, numerous elastic fibrillæ; while by further variations of the foregoing method the isolated elastic fibrillæ of the cornea may be obtained. The preparations are quite permanent.

Demonstration of Karyokinetic Figures.—According to B. Solger,¹⁰⁹ the amnion of the embryo rat is a better material for the demonstration of the figures than the mesentery of the young rabbit, which has hitherto been recommended for the study of karyokinesis. Besides the fact that it is readily obtained, the rat amnion presents the further advantages that it may be studied without the tedious processes of imbedding and sectioning. Solger's technique is as follows: The freshly dissected horn of the uterus is put at once into a saturated aqueous solution of picric acid and immediately afterward the chorion is cut open with scissors. The amnion then separates as an exceedingly tenuous membrane enveloping the embryo. Let remain in the picric-acid solution for twenty-four hours; remove and wash in alcohol of 70°. The dilute alcohol is gradually replaced by stronger until 95° per cent. is reached. The material is then stained, either with Ehrlich's acid hæmatoxylin or safranin, after Flemming's method.

Brain Specimens.—M. J. Honegger⁴⁰¹ remarks that specimens of brain which have been long preserved and have not decomposed can be fitted for microscopical uses by treating them for several days to a bath of nearly boiling water, which must be frequently renewed. [Presumably this treatment could be successfully applied to other organs.]

Museum Specimens.—Richard Thoma,⁸⁵⁴ describes a method for retaining the natural color of organs in museum preparations. After slight washing in water they are placed for some hours in this solution:—

R Crystallized sulphate of soda,	100 grammes (3½ ounces).
Chloride of sodium,	100 grammes (3½ ounces).
Chlorate of potassium,	100 grammes (3½ ounces).
Nitrate of potassium,	10 grammes (2½ drachms).
Water to	1 litre (1 quart).

The organ is suspended for twenty-four hours in this solution, and then placed in pure spirit, which requires changing once or twice. It is better to immerse only portions of the larger organs. The preparations retain their appearance for months, the only notable change being the conversion of the red color of hæmoglobin into the browner tint of methæmoglobin. Nor is their structure so affected as to be unfit for subsequent microscopical examination.

Photomicrography in Space.—Fayel, President of the Société Linnéenne de Normandie,⁴⁰⁰ communicates the following: Under the designation of *photography in space*, Fayel records a process of his invention which facilitates the observation of opaque objects by the microscope, even with powerful objectives, and which he thinks will hence render important service. Instead of focusing directly upon the object, Fayel allows the image to be projected in the ground glass of the photographic camera, and then removes the ground glass and examines the aerial image with the microscope. In order to reduce the labor of adjusting the microscope, it should first be focused very near the plane of the ground glass. The image appears so sharp that the minutest relief forms of the opaque objects may be observed by manipulating with the fine-adjustment screw.

Rapid Preparation of Tissues.—S. H. Gage,²¹⁶⁰ believing that too much time is lost in preparing specimens for the use of students in histology, recommends the following rapid method: The tissue is cut into pieces of moderate size and placed for from one to two days in this solution: 95-per-cent. ethyl alcohol, 250 cubic centimetres (8½ ounces); water, 250 cubic centimetres (8½ ounces); picric-acid crystals, 1 gramme (15½ grains). Then for twenty-four hours in 70-per-cent. alcohol, and then for a day or longer in 80-per-cent. alcohol, where it may remain indefinitely. When needed, dehydrate in 95-per-cent. alcohol and infiltrate with paraffin or collodion after the usual manner. This process

takes not longer than a week. This method is excellent for all tissues except peripheral nerves, especially those possessing ciliated epithelium. Hæmatoxylin is recommended for a double stain. For a clearing medium he prefers: carbolic-acid crystals (melted), 40 cubic centimetres (1 $\frac{1}{2}$ ounces); turpentine, 60 cubic centimetres (2 ounces). For peripheral nerves he prefers Flemming's chrom-acetic-acid method. The specimen is placed for twenty-four hours in a large volume of this solution: chromic-acid crystals, 6 grammes (96 grains); glacial-acetic acid, 2.4 cubic centimetres (38 grains); water, 2400 cubic centimetres (2 $\frac{1}{2}$ quarts). Proceed as with the picric-alcoholic method. Hæmatoxylin is preferred as a stain.

Infiltrating Osseous and Dental Tissues.—T. Charters White⁴⁰⁰ recommends the following method: The section may be cut or ground moderately thin and soaked in ether for twenty-four hours. It is then to be transferred to a thin collodion stained with fuchsin, where it may remain for two or three days to allow the stained collodion to follow the ether into the minutest ramifications of the tissue. It is now to be placed in methylated spirits, which will harden the collodion, where it may remain until convenient to grind it down to its final thinness. When sufficiently thin the section may be mounted, *surface dry*, in stiff Canada balsam or styrax, but without unnecessary heat, in order to avoid vaporizing the moisture contained in the cavities of the tissue. By this method any unsuspected or abnormal cavities are made very evident. The toughness of the collodion makes brittle tissues less friable, facilitating grinding. To prepare the collodion stain he recommends that the dye should be mixed with methylated spirits, the requisite amount of ether added, and lastly the pyroxylin. He has tried other aniline dyes, but found none equal to fuchsin.

Bone-Marrow.—E. Neumann²⁰,⁴⁰⁰_{411, 412, 413} states that the various phases of the development of the red blood-corpuses may be observed in the following manner: The marrow is squeezed out of some cancellated bone by means of a vise; a small quantity of this marrow is placed on a slide, covered, and examined without further treatment. By this means good results can be obtained from ribs of human bodies which have been dead for some days.

BACTERIOLOGY.

BY HAROLD C. ERNST, A.M., M.D.,
AND
HENRY JACKSON, M.D.,
BOSTON.

New Works and Monographs on Bacteriology.—The latest edition of C. Fraenkel's ²¹¹⁵ work includes all the most important additions to bacteriological technique. The arrangement of the book is so simple, and his description of bacteriological methods so exact, that the work is equally useful to the beginner and the more advanced student. Especially noteworthy are the minute directions given for the preparation of nutrient media. An excellent index adds much to the value of the book. A translation of the same work has been made by Lindsley, of New York. ²¹¹⁶ It is to be regretted that he has omitted the side-notes found in the original work, which aid materially in finding any desired subject. No plates are printed in the American edition.

Carl Günther ²¹¹⁷ has issued a second edition of his valuable book for beginners and general practitioners, which also contains many good points for those more specially employed in the bacteriological laboratory.

M. V. Ball's work ²¹¹⁸ contains a great amount of information,—almost too much for the student. The simple classification of bacteria into "micrococci, bacilli, and spirilla" appears to the reviewer most desirable, as, to quote the words of Ball, "a better one has not been found." The chapter on physiological and pathological properties of bacteria is concise and clear. Some errors appear, as the recommendation of oil of cloves to clear specimens stained with aniline dyes (p. 36).

F. Hueppe ²¹¹⁹ has issued a fifth edition of his classical work on bacteriology. Woodhead, ²¹²⁰ in the introduction to his book, gives a lucid and comprehensive review of the science of bacteriology and its progress to date. The methods of classification

are complicated, and hardly desirable in a work of this sort. The author gives a short history of the work done on fermentation and on several pathogenic bacteria. It is to be regretted that he has hardly mentioned the various surgical diseases and the micro-organisms associated with them. A concise and interesting article is written on hydrophobia. The work is a good review of most subjects in bacteriology, but the author does not intend it for use in the laboratory, very little space being devoted to bacteriological technique.

Crookshank's²¹²¹ third edition contains many beautiful colored lithographs of cultures of bacteria; these plates would be much more useful if the names had been printed beneath each subject, instead of at the beginning of the book. As the book is essentially elementary, the author recommends a great many unnecessary reagents. The description of the technique of bacteriology is not sufficiently clear, nor always exact enough to recommend the book to beginners. The plates form its chief merits.

Macé²¹²² has issued a second edition of his useful little book.

G. Salomonsen's "Technique of Bacteriology" has been published in French²¹²³ and English.²¹²⁴ It contains much useful information as to the preparation of culture media. As an elementary book the methods are too complicated, but for the advanced student it contains much valuable information; for instance, as to the cultivation of anaërobic species.

Bernheim²¹²⁵ has written an excellent small book for students. Eisenberg,²¹²⁶ in his first edition, mentioned 136 species; in the third edition, 376 species are described. In an appendix he gives the method of preparation of culture media, also methods of staining. This work is a necessary part of every laboratory outfit.

Baumgarten, for his fifth year, gives a review of 1889,²¹²⁷ and the sixth year is promised as almost ready. One thousand and seventeen articles and works are reviewed. Baumgarten has just published an index to the first five volumes. This is an invaluable book for the student of bacteriology; it is not a mere index, but is so classified that one may see at a glance the most important matter noted in the article reviewed.

Carl Günther,²¹²⁸ has published a short review of the most recent additions to bacteriology. A. Holst²¹²⁹ has published a book intended to inform the general practitioner and student of the most

recent advances in bacteriology. L. Heim⁵⁰ has published a review of the progress in the methods of bacteriological technique since the year 1887. Two new annuals on bacteriology have appeared this year: one,²¹²⁹ an epitome of work done at Tübingen, edited by Baumgarten, the first number containing many important articles, notably one on "Diphtheria" and one on "Pseudo-leukæmia and Tuberculosis." The second²¹³⁰ contains a complete bibliography of the branch of bacteriology relating to fungi, with a short review of each article. It is edited by Alfred Koch, of Göttingen.

Eberth²¹³¹ has published several colored plates of several different bacteria,—tuberculosis, micrococci, tetragenii, etc.,—which are very useful for class demonstration. Fraenkel and Pfeiffer²¹³² have issued two parts of their atlas, containing, among others, articles on tetanus, tubercle, and cholera. Vaughan and Novy²¹³¹ have issued a second edition of their work on "Ptomaines and Leucomaines." Czaplewski²¹³² has written a most complete essay, giving in detail macroscopical, microscopical, and staining methods for examination of sputum. A chapter is devoted to methods of examination for elastic fibres,—a matter too often neglected.

David²¹³⁵ has issued a most interesting book, giving a short account of the various organisms which habitually occur in the mouth, also of various pathogenic germs occasionally found there,—as bacilli of tuberculosis, etc. The book is beautifully printed with good plates.

W. D. Miller's²¹³⁶ work contains, in convenient form, all the valuable original work which he has performed on the relation of bacteria to dental caries. An account of the organisms found in the healthy mouth, a most exhaustive treatise on decay of the teeth, and many valuable prophylactic and therapeutic suggestions are given. H. Ribbert²¹³⁷ devoted a monograph to the study of various pathological processes dependent upon *staphylococcus pyogenes aureus*, and especially on the effect of the pathological processes produced by the toxic properties of this organism. His experiments on animals show that when this micro-organism is injected into the veins the kidneys are most affected, then the heart, whereas lungs, liver, and spleen are less often affected. To the presence of a toxine he attributes the necrotic and inflammatory processes in the neighborhood of the colonies of bacteria. L. Pfeiffer²¹³⁸ gives a good review of all that is now known on protozoa.

METHODS.

Botkin⁵⁸ suggests a practical method for the isolation of anaerobic bacteria. The principle depends upon placing the material for culture in small dishes of gelatin or agar, and these in a chamber filled with hydrogen. The method by which this is accomplished is well shown by the figure. (See Fig. 1.)

Hazen and White⁵⁹ suggest a method for the employment of agar plate cultures for the detection of pathogenic bacteria in water. They find that by plunging melted nutrient agar into water at 40° C (104° F.), it may be reduced to this temperature without solidifying, and that then mixtures of bacteria may be safely put in and plate cultures made. The advantages of the method are, of course, easily apparent for certain conditions.

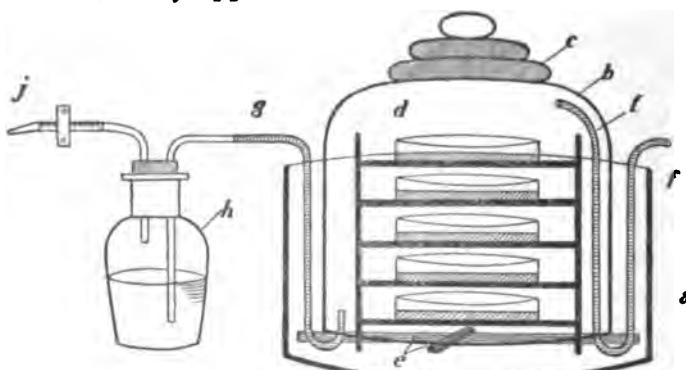


FIG. 1.—BOTKIN'S METHOD OF ISOLATING ANAEROBIC BACTERIA.

a, outer dish; b, bell-jar; c, lead weights for pressing down the bell jar; d, stand for dishes; e, cross of lead, hammered flat; f, rubber-tube with wire protection for introducing steam; g, similar tube for exit; h, washing-bottle; j, exit.

(*Zeitschrift für Hygiene und Infektionskrankheiten.*)

Nuttall⁷⁰⁴ gives a method for the determination of the actual number of tubercle bacilli in tuberculous sputum, which, though so ingenious and effective, is so complex that it will hardly come into general use.

The application of the *centrifuge* to the detection of few bacilli in the sputum of suspected cases has been made by Kroenig^{4, 50} with very considerable success, and its applications seem to be widely and rapidly extending.

Delépine⁶ describes a new method—"interlamellar film"—of studying the development of micro-organisms, and the mutability of their characters and properties, that may be of very great assistance in elucidating certain of these points. (See Fig. 2.)

Prausnitz³⁴ suggests two small pieces of apparatus that may be of great value in certain processes of bacteriological technique.

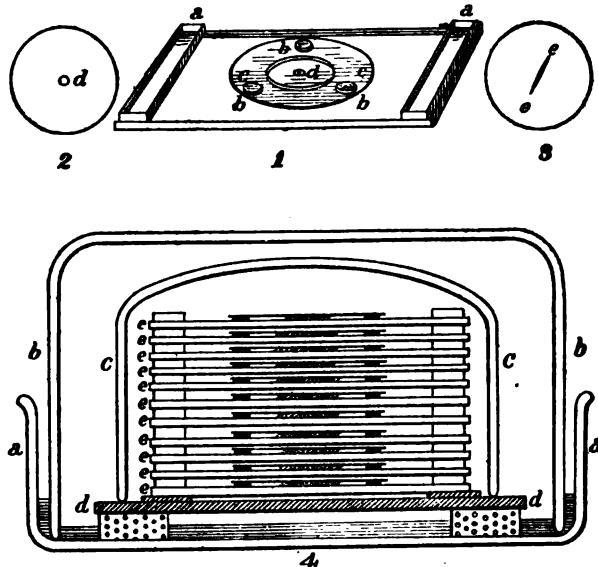


FIG. 2.—DELEPINE'S METHOD OF "INTERLAMELLAR FILMS."

1. a, slide with interlamellar film, ready for incubation: a a, side rests; b b, drops of sealing wax supporting the cover; c, cover-glass compressing a drop of nutrient material; d, very small central drop inoculated (d). 2. A cover-glass with a very small central streak (d) containing micro-organisms. 3. A cover-glass with a small central streak (d) containing micro-organisms. 4. Diagrammatic representation of eleven interlamellar cultivations in a moist chamber, showing the disposition which I have adopted both for this method and for other forms of film or plate cultivations; a, outer basin containing a thin layer of water at the bottom; b, covering basin with flat bottom, allowing a series of moist chambers to be piled one above the other in the incubator; c, inner bell preventing condensed water falling upon the slide; d, plate supported by pieces of cork; e's, slides.

(*London Lancet*.)

The first, illustrated in Fig. 3, may serve for the detection and removal of a single colony on Koch's plate cultures; the second, illus-

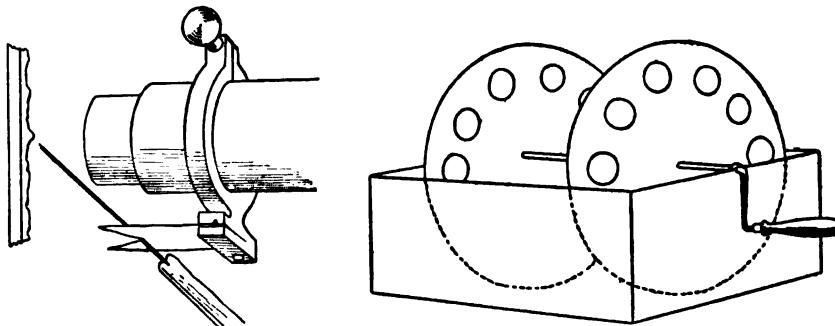


FIG. 3.—PRAUSNITZ'S ATTACHMENT TO MICROSCOPE FOR GUIDING NEEDLE IN SELECTION OF SINGLE COLONY ON PLATE CULTURE.

(*Münchener medicinsche Wochenschrift*.)

FIG. 4.—PRAUSNITZ'S APPARATUS FOR FACILITATING PREPARATION OF ESMARCH'S ROLL CULTURES. (NOTE.—The speed of revolution should be slow.—EDITORS.)

trated in Fig. 4, furnishes an easy method for preparing a number of Esmarch's roll cultures at the same time.

IMMUNITY.

An enormous amount has been written and a great deal accomplished upon the subject of immunity. The various theories are summarized in a very interesting article, as follows³¹: 1. A theory of exhaustion, advanced by Pasteur and by Cliff, which is, that the nutritious materials necessary for the existence of bacteria are entirely exhausted by the first attack of disease. 2. A theory of localization, represented by Eichorn, Buchner, and Rosenburg. 3. A theory of the cell-action, presented in two aspects,—that of phagocytosis, by Metschnikoff, and that of envelopment, by Ribbert. 4. A theory of *adaptation*, by Grawitz and Flint, in which immunity is supposed to be the result of the adaptation of the cellular elements to the energetic assimilating functions of the bacteria. Acquired immunity, according to this theory, consists in a transformation of the biological function of the organism. 5. The *chemico-cellular theories*, represented by Schlager and others, that admit, in a general way, the existence of certain antiseptic properties of the cells that are increased by the first bacterial attacks. 6. The theory of *retention*, presented by Chauveau, in which the bacteria first introduced secrete material that remains in the body, and prevents a later development of the same organism. All of these theories, carefully criticised, are, taken by themselves, subject to certain objections, which the article in question fully discusses.

P. Ehrlich⁶⁹ gives the results of experimental work with abrin, ricin, and robin, phytalbumoses, with which he feels that he has obtained a certain amount of immunity in mice and rats against inoculation with anthrax. In the case of abrin, he thinks it clear that there is produced in the blood a body—anti-abrin—which paralyzes the action of abrin itself, probably by a destruction of this body.

Upon the question of immunity, as affected by the action of pigeons' blood upon anthrax bacilli, the following conclusions are reached⁵⁸⁹ _{Aug. 18}: That healthy pigeons' blood has a great bactericidal power unaffected by previous bleeding of the animal; that this bactericidal power is exercised not only on bacilli, but also on spores. That any bacilli that escape destruction retain their virulence unaltered; it is not therefore a question of attenuation. That the blood of a starved pigeon is either wanting or greatly deficient in bactericidal power. It was found, further, that, after bleeding,

pigeons are still unsusceptible to inoculation with anthrax bacilli. Bleeding, therefore, has not the same effect as fasting, as might have been already anticipated from the results of other experiments. Immunity in pigeons against anthrax is, therefore, due solely to the bactericidal power of their blood.

Metschnikoff,² in a lecture upon phagocytosis and immunity, made the attempt to prove that the defending powers exercised by the amœboid cells of the organism are, in a large measure, concerned in conferring immunity. The aggressive characters of these amœboid cells has earned for them the name of phagocytes, and Metschnikoff points out that they are of different kinds and originate in various ways.

The theory propounded by him is, like all the previous communications made by him on the subject of intra-cellular action, the outcome of patient and industrious observation, and must command our attention. His views, formulated for the first time in a consecutive manner in this lecture, promise to revolutionize opinions as to inflammation and fever, and this attempt to explain the power of the cells to confer immunity from infectious diseases is sure to be hotly contested; for every important contribution to this confessedly obscure subject must necessarily be, in a large measure, hypothetical.

Buchner,⁴ gives a very good summary of a theory in regard to the chemical irritability of the leucocyte, and of its relation to inflammation and suppuration. In the past the product of decomposition has usually been assigned as the cause for the strong attraction toward leucocytes shown by cultures of bacteria, but Buchner found, at least in the cases he had under his own observation, that the albuminoid materials of the bacteria were the cause. The protein from the lactic-acid bacillus showed a strong chemotactic action. Various other proteids have been obtained, and one of the easiest of these is from the bacillus pyocyaneus. That from the staphylococcus pyogenes aureus, from the typhoid bacillus, from the bacillus pyocyaneus, the bacillus acidi lactici, and from the red-potato bacillus, all strongly attracted leucocytes when inserted aseptically in closed capillary tubes beneath the skin of a rabbit, and one end of the tube was broken afterward *in situ*.

The proof was also obtained that the so-called products of decomposition of bacterial cells may be absolutely discarded as an

attracting agent of leucocytes. In addition to work already done, the author tested butyric and valerianic acids, trimethylamin, ammonia, urate of ammonia, and other materials; all of these gave results that were mostly negative. The vegetable caseins were also examined, and were found to attract leucocytes strongly. These results are probably but the beginning of others that will be of the greatest importance. There is no question that the investigation of the chemotactic powers of the leucocytes is one of the most important lines for investigation that is now open.

Dillet ⁶ gives the following very good summary of the ideas held in regard to acquired immunity: 1. A refractory state resulting from a first attack of certain fevers, instancing small-pox, measles, and so on. 2. A refractory state produced by inoculation of allied disease, or of the disease modified by passing through another animal. This is the history of inoculating cow-pox as a preventive against small-pox. 3. A refractory state produced by inoculation of a virus modified by cultivation outside of the body, as has been done with anthrax and other diseases of the same class.

The method of treatment of infectious diseases of the present day may be divided into three classes,—(1) the preventive, (2) the protective, (3) the curative. The preventive method consists in destroying or attenuating the cause, or avoiding it in some way or other, so that the body may remain unaffected. Lister's antiseptic method, residence in high localities, drainage, absolute cleanliness, and so on, are all parts of this method. Protection consists in so modifying the possible host as to render it able to resist virulent parasites. This is done, either by increasing its strength and activity, rendering its tissues and fluids unsuitable media for the growth or full development of the parasite, as in inoculation and Jenner's vaccination, and by establishing tolerance. The curative method consists in attenuating or entirely destroying the virus causing the disease after it has penetrated into the body. The actual destruction of the parasite within its host is apparently still a desideratum.

Attenuation of the virulence can be obtained (1) by introducing into the blood and tissues some product either interfering with the full development of the parasite, or modifying the tissues and fluids of the body, so as to increase their resistance to the extension of the parasites or to its products. 2. Neutral-

izing the physiological action of the virus by using a physiological antagonist. Muscarine, for instance, may be antagonized by atropine. 3. Destroying and removing the substratum or ground which has become contaminated by the parasites. This is the view that Koch took as to the action of his paratalloid.

Von Fodor⁵⁰ gives the results of an important series of researches in regard to the germicidal properties of blood. He finds that arterial blood has a more destructive action on the bacteria than venous, and that fresh blood has a more powerful action than that which has been shed for some time. The germicidal power of the blood was weakened in an atmosphere consisting entirely of oxygen or carbonic acid, and, on the other hand, the removal of gases from the blood had no appreciable influence. The blood of rabbits which had been poisoned by carbonic-acid gas was not fatal to the bacteria. In regard to the temperature of the blood, its germicidal power is increased with the rise of temperature, reaching its maximum at from 38° to 40° C. (100.4° to 104° F.), and then again gradually diminishing. He finds that the individual predisposition of any animal to an infectious disease seems to stand in direct relationship to the germicidal power of its blood. In regard to the influence of drugs on the blood, in its power to destroy bacteria, he found that hydrochloric acid had no effect; that tartaric acid produced a marked decrease of power; and the same result was produced by quinine. Common salt and carbonate of ammonia caused a slight increase of the power, the phosphate of sodium a more marked effect, while the carbonates of sodium and potassium produced a very remarkable increase.

From these experiments, he concluded that any drug which increased the alkalinity of the blood considerably raised the resisting power of the organism against the inroads of bacteria, and a series of inoculation experiments corroborated this supposition. Of 8 rabbits inoculated with anthrax, all died, while of 19 which had previously been injected with soda solution, only 3 died, thus proving the efficacy of the alkalization of the organism. Of the remaining 16 cases, a few were affected at a later date, but the majority remained perfectly free from disease.

Hankin⁵⁰ finds that from the blood and serum of the rat a basic substance can be obtained which differs from other known bases in that it is insoluble in distilled water and alcohol, and in

that it does not dialyze. This substance is of a proteid nature, and belongs to the globulins, though it differs from the majority of them in the fact that precipitation by alcohol does not render it permanently insoluble and that its solutions are alkaline. This globulin has bactericidal properties, and to it is due the bactericidal action of the rat's serum. Probably the immunity of rats toward anthrax and diphtheria is wholly or in part due to the capacity of the rat organism to produce this substance.

Not only outside the body, but also within the organism, this substance can exert its bactericidal powers. He was able, in certain cases, to ward off the evil consequences of inoculation of anthrax culture by injecting a solution of globulin. It must be added, however, that with animals as susceptible to anthrax as rats are insusceptible he was not completely successful. This does not diminish the importance of the observations in the further light they throw upon the causation of immunity. If they do nothing else they tend to reconcile the two main opposing schools: that of Metschnikoff, looking upon the bacteria as being destroyed within the cells, and that of Nuttall, Buchner, etc., considering the destruction as taking place almost wholly in the blood-serum and fluids of the body. For these globulins are evidently elaborated within what may be termed the sphere of the phagocytes, and their appearance in the blood-serum would seem to be due to the breaking down of the white blood-corpuscles, a process that we well know is continually taking place.

Enderlen ³¹ gives the results of a series of experiments upon the bactericidal power of the blood, which seem to him to bear out the assertion of Buchner that this power lies distinctly and solely in the blood-serum. Rummo ³⁴ gives the results of many experiments of his upon the same question, and with about the same results.

Eternod and Haccius ^{35, 36} give the results of certain of their researches upon the question of the unity or duality of variola and vaccinia, using a special method of inoculation that they call surface inoculation. They conclude as follows: (1) that variola is inoculable on the bovine species if the inoculation be properly made; (2) inoculation in this manner affords a valuable means of obtaining fresh sources of animal vaccine; (3) variolous inoculation on the calf becomes changed, after some generations, into

vaccinia ; (4) their conclusions confirm the views proposed in 1863 by Duclaux, at the Paris Academy of Medicine.

Barbier⁵⁵ _{Jan. 17 to Feb. 14} gives a very exhaustive review of the work done upon the blood in its defense of the organism against infection. He concludes that the outcome of the new notions acquired upon the physiology and pathology of the blood is, that the serum of an animal not refractory to an infection may acquire bactericidal properties for this infection by different means ; that this bactericidal state is not due to an action of the figured elements of the blood, but depends upon special properties acquired by the serum, separate from its corpuscles and living cells, under the influence of vaccination ; that it acts not as a chemical agent in preventing the growth of the bacteria and attenuating their virulence, but by determining a special nutrition of the tissues that renders them unfavorable to a pathogenic agent.

Giacosa,⁵⁸⁹ _{June 18} writing upon the same subject, gives the following as the result of a great deal of his work : Tolerance in certain animals is due to various causes : (1) as the result of habit ; (2) as the organ or function on which the drug acts is absent or imperfectly developed, as in frogs, on which morphine has no effect. We now know that tetanus is due to a chemical substance, well defined and isolated, produced by a specific bacillus, and the serum must act either by destroying this poison or by rendering it inert. It is possible that the same explanation will be found to apply to some other infectious diseases,—such as diphtheria, tubercle, and pyæmia,—but our knowledge is not yet so complete in regard to these diseases.

The study of immunity may possibly thus resolve itself into a pharmacological or even a chemical problem.

Gamaleia³¹ _{May 11} gives a review of what he calls a new theory of immunity, being a consideration of the so-called “proteides défensives.”

According to the works of various authors,—Buchner, Behring, and others,—immunity is due to albuminoid substances that, after Hankin, are to be called defensive proteids, and that have the property of destroying pathogenic bacteria, of attenuating them, or of destroying their toxic products. Of these, he considers, first, a class of microbicide proteids, a property first shown by Behring to be contained in the serum of healthy animals, and especially ex-

perimented upon in the blood of white rats; then comes the class of attenuating proteids, first shown by Grohmann and further elucidated by Ogata and Jasuhara. The latter authors attempted to discover whether this attenuating property resided in the serum of refractory animals, and, according to their results, it apparently does. This attenuating action of the serum of refractory animals explains, naturally, their immunity.

Finally, and of most importance, comes the class of antitoxic proteids first shown by Behring and Kitasato, in 1890, in the blood and serum of rabbits vaccinated against tetanus; for in this way they found that this serum had the power of destroying, during life, the toxine of tetanus.

The following is one of their experiments: A cubic centimetre of a filtered culture of the tetanus bacillus, sufficiently toxic to destroy a guinea-pig in a few days, in a dose of five-tenths of a cubic centimetre, was mixed with 5 centimetres of the serum of a rabbit refractory to tetanus, and twenty-four hours afterward 4 guinea-pigs were inoculated, each one with 2 cubic centimetres of this mixture. The same filtered culture, not mixed in antitoxic serum, was injected in the control guinea-pigs, in the dose of one-tenth of a millimetre. These latter died in thirty-six hours, while the first 4 remained indefinitely refractory. The antitoxic influence of the serum of vaccinated rabbits exercises itself not only during life, but also in the bodies of guinea-pigs, so sensitive to tetanus.

Thus, for example, 2 centimetres of the serum of a refractory rabbit were sufficient to vaccinate guinea-pigs against tetanus. The authors also succeeded in curing, by injections of the serum of rabbits, guinea-pigs already attacked by tetanus and presenting tetanic convulsions.

The same fact has been established by these authors in diphtheria, where the serum of animals vaccinated with this disease possessed the power of destroying diphtheritic poison. These results have already been confirmed by other authors as far as tetanus is concerned, but we have not yet fixed upon the precise nature of the defensive proteids.

According to Hankin, it is an alkaline albuminoid; according to Buchner, a special state of serum-globulin; and according to others, a diastase. We do not yet know the distribution of the

defensive proteids in the different tissues of the animal economy. There has thus far been studied liquefied blood-serum, aqueous humor, and pericardial fluid.

We also know that certain organs contain some of these proteids,—as, for example, the spleen,—as proved by Hankin and Gamaleia's researches and methods.

In spite of the great number of unknown points that still surround this new theory of immunity by defensive proteids, it can already be predicted that it will come out victorious in the struggle in which it has engaged,—with the numberless hypotheses and the old prejudices that surround and encumber this branch of general pathology. It will be victorious, for it has already given certain proofs of its importance by vaccinating and curing animals by means of these defensive proteids. This point will be seen in the last part of this review. Gamaleia discusses, also, artificial immunity by means of defensive proteids. This,—the refractory condition in animals enjoying immunity,—whether natural or acquired, is due to the presence in their bodies of an antiseptic substance that can be isolated from the lining organism. Nothing is more natural than an attempt to reproduce by this substance antisepsis in the bodies of animals which do not have this immunity, and this was done by the transfusion of the blood of a dog—an animal that is refractory to the septic streptococci—to rabbits, ordinarily sensible to infection by these bacteria, making these rabbits refractory to this inoculation.

The authors employed, however, for transfusion, the entire blood, which prevents a consideration of their work as a successful proof of the vaccination by defensive proteids in the fluid of the animal. The first to confer immunity by serum were Ogata and Jasuhara, of whom we have already spoken. They obtained results with anthrax, and analogous results in the septicæmia of mice. As to anthrax, we often quote the experiments of Behring, who vaccinated guinea-pigs with the serum of rats, and the experiments in which anthrax was prevented in the same animal by the serum of rats, and also by an albuminoid extracted from the spleen of a rat.

Behring and Kitasato ⁶⁰ produced immunity against tetanus, and even cured the disease, by the serum of vaccinated rabbits. They obtained the same results in diphtheria. Emmerich ⁸⁴ cured

rouget by infusion of the serum of vaccinated animals. Héricourt and Richet⁵⁵ increased the resistance of rabbits to tuberculosis by infusing the serum of dogs. Bouchard⁴¹⁰ obtained the same effect by this infusion, affecting the resistance of rabbits to the attack of bacillus pyocyaneus. Other identical results are already announced, and one can easily understand the importance of such experiments as these. From a theoretical point of view, they change completely the question of immunity; for, even if one does not like to venture into unlikely and artificial explanations, one can admit that the serum which confers immunity does it by the same antiseptic properties—the defensive proteids—that have been established as existing in the bodies of refractory animals. One also ought to admit that the serum which is able to confer immunity is able also to explain it, and it is not necessary to have recourse to other hypotheses. From the point of view of practice, the experiments give us for the first time a rational method—since it is founded upon internal antisepsis—for preventing infectious maladies and for curing them. We conclude, then, that actually the only plausible theory of immunity is that which explains it by the disinfecting properties of the liquids of the body; by the special antisepsis of the animal tissues; by the defensive proteids, in other words.

We would add, also, that all complete explanation should take into consideration the true properties of defensive proteids, their microbicide action, their attenuating action, and their anti-toxic action.

Ogata²⁰⁰ gives a very interesting article on the "antibacillic" substance of the blood. As the result of his experiments, he finds that the substance which has the power of making animals immune to anthrax and septicæmia may be the ferment existing in the blood of animals which are already immune. Moreover, this ferment has the power of preventing the development of cholera and typhoid bacilli. The results of his experiments he summarizes as follows: (1) the antibacillic substance is soluble in water and glycerin, and, although it is insoluble in alcohol and ether, it does not lose its power by these free agents; (2) it does not lose its power when mixed with weak alkali, but does lose it when mixed with carbonic and hydrochloric acids; (3) it loses its power by the action of the digestive fluids at a temperature of 45° C.

(113° F.); (4) the antibacillie substance has not only the power of making animals immune, but also has the antiseptic powers of putrefaction, and, when mixed with glycerin, it can be kept for a long time without any changes; (5) this substance has no power to change fibrin into peptone nor starch into sugar.

The following is the method of preparing the ferment: Add 10 or 15 parts of a mixture of alcohol or ether to 1 part of blood-serum; let it stand quietly for one or two days, then filter and gather the precipitate on the filter-paper, and dry in the air. Pulverize the dry precipitate in a mortar, and add a lukewarm mixture of glycerin and distilled water, and, after leaving it for three or four minutes, press with a piece of linen or muslin and filter through paper.

To the precipitate again add a mixture of alcohol and ether, and, after standing for one day, filter and dry the precipitate. Dissolve this dry precipitate in distilled water (one-fourth of its volume), filter, and again, after adding the mixture of glycerin and distilled water (one-fourth of its volume). This filtrate is the glycerin extract of the ferment, and has the power above mentioned. As to the quantity to be injected, that must be determined by experiment.

Behring and Riesen⁵⁸ give a very exceedingly interesting résumé of the bactericidal action of different species of blood-serum. Following their experiments with the serum of rats on anthrax bacilli, these authors examined in the same way the blood of other species of animals, in order to find if there is any relation between the immunity of an animal against a bacterial disease and the bactericidal action of its serum. The authors establish that there does not exist in the normal guinea-pig a serum which is capable of destroying the bacillus of anthrax, while the serum of all animals which have received immunity possess this bactericidal power in a complete way. The serum of guinea-pigs destroys the bacilli of cholera which are not encountered in the blood of living animals, but not the bacillus of anthrax. In guinea-pigs which have received immunity against the last disease, the blood contains proteid-productive substances that can destroy the vibrio of Metschnikoff, and the action of these substances is preserved in the serum. These substances are entirely different from those which destroy the bacilli of anthrax in the serum of rats, and also from those to

which it is necessary, according to all probability, to ascribe the natural immunity of rats against anthrax. The serum of rats, in fact, does not possess this bactericidal property against the vibrio of Metschnikoff, and, on the other hand, the serum of guinea-pigs, which possess immunity for this latter disease, does not have it for the anthrax bacilli; but it is not the same in all acquired immunities. The serum of sheep vaccinated against anthrax, as well as that of rabbits who have an immunity against the bacteria of pneumonia, possesses no bactericidal action against these bacteria.

In order to determine these entirely different phases of immunity, isolated observations upon each species of animal and on each species of bacteria are necessary. One must give up the idea of discovering a general bactericidal action of the blood-serum, as Buchner has attempted to do.

Buchner ²⁴ gives a very interesting summary of our knowledge of immunity, the natural occurrence, and artificial production, that, up to the time it was written, is a satisfactory review of the results obtained by the many workers upon this important subject.

Hankin ²⁵ gives a summary of the work upon immunity, and especially a series of names which he proposes for the designation of the subdivisions of the classes of defensive proteids that were first suggested by him.

“Defensive proteids appear to be ferment-like albuminoid bodies, and it is extremely unlikely that we shall, for a considerable time, be able to classify them by any other than physiological tests. From this point of view it is possible to divide them into two classes: (1) those occurring naturally in normal animals; (2) those occurring in animals which have artificially been made immune. For these two classes I propose the name of *sozins* and *phylaxins*. A sozin is a defensive proteid which occurs naturally in a normal animal. They have been found in all animals yet examined, and appear to act on numerous kinds of microbes or on their products.

“A phylaxin is a defensive proteid which is only found in an animal made immune against a disease, and which, so far as is yet known, only acts on one kind of microbe or on its products. Each of these classes of defensive proteids can obviously be further subdivided into those which act on the microbe itself and those

which act on the poison it generates. These sub-classes I propose to denote by adding the prefixes *myco-* and *toxo-* to the class named. Thus, *myco-sozins* are defensive proteids occurring in the normal animal, which have the power of acting on various species of microbes. *Toxo-sozins* are defensive proteids, also occurring in the normal animal, having the power of destroying the poison produced by various microbes. *Myco-phylaxin* and *toxo-phylaxin* similarly will denote the two sub-classes of the *phylaxin* group.

“When first the action of blood-serum was worked out, it was supposed that a serious blow had been struck at the phagocytic theory. The discovery of defensive proteids shows, however, that this is by no means necessarily the case. I first obtained defensive proteids from the spleen and lymphatic glands of various animals; that is to say, they were obtained from cells that are potentially phagocytes. It is possible that they are the weapons used by phagocytes in their conflict with the microbes, and that only after the death of the cells do these substances find their way into the blood-serum; though it may be held probable for phylaxins that there is as yet no formal proof that sozins are present in the serum in the living blood-plasma. The fact that sozins are present in the serum no more proves their presence in normal blood-plasma than does the allied body-fibrin in one prove its presence in the other.”

Exceedingly important, as presenting another view of the subject, are the results and researches of Emmerich ³⁴ May 12, 19 on the cause of the immunity from infectious diseases that sometimes exists naturally, and that can be produced by preventive inoculation, and the cause of the retrogression of an infectious disease when it has once been set up. For various reasons, swine-fever was the disease selected for the investigations; and he claims that he has proved the truth of the theory that the cause of artificial immunity lies in an antibacterial toxine which is, however, non-injurious to the organism; that the toxine is produced by the irritation which the invasion of the bacteria causes in the cells; or that there is a combination formed by the mutual interaction of the peculiarly modified decomposition products and the tissue changes of the bacteria themselves. The curative action of the tissue-fluid could not be doubted. In the case of white mice and rabbits, every

case of the fever could, without exception, be cured with certainty, provided that the bacilli of the disease had not entered and disseminated themselves through the system more than twenty-four hours previous to the inoculation. The fact that the curative fluid exerted its influence even when the animal injected was of a different kind to that yielding the fluid, and that fluid from protected rabbits rendered white mice proof against the disease, justified the hope that fluid from protected rabbits could be successfully employed to cure infected swine.

He claims that he has, by these experiments, entered upon the first stage of a certain and rational treatment of infectious diseases, and urges it to be the duty of all to strive for the attainment of an ideal treatment that can complete the discovery and the manufacture of the true antibacterial material. The time is, perhaps, not far distant when such a material will be in the hands of all who are called on to treat infective diseases. Other diseases besides swine-fever are already under investigation.

It will be observed that the difference between the treatment introduced by Koch and that by Emmerich is, that the fluid used by Koch is procured from pure cultures of the tubercle bacillus itself, while Emmerich's comes from the protected animals themselves.

SPECIFIC BACTERIA.

Amœba Coli.—Kartulis⁵⁰ re-inforces his former statement in regard to the amœba coli as the cause of dysentery, giving the results of a number of fresh observations and experiments. He claims to have obtained pure cultures of this amœba in decoctions of fresh straw, upon which they grow with great freedom and rapidity. The method is, upon or in this decoction of fresh straw to place a drop of a fresh dysenteric stool, at a temperature of from 30° to 38° C. (80° to 100.4° F.). On the second day, on the surface there will be young amœbæ in swarms; later, pseudopodia; and on the fourth to fifth day these will produce spores, which will develop into the full-grown amœbæ in from eight to eleven days. He obtained successful inoculation results in cats.

It is to be regretted that the very admirable paper of Councilman upon this subject has appeared too late to be noticed in this year's summary.

Bacillus Coli Communis.—Barbacci¹⁷ gives the results of

work upon the bacillus coli communis and peritonitis following perforation. As the results of the bacteriological examination of 4 cases of death from peritonitis after perforation, he finds the bacillus coli communis in all, and furnishes a number of interesting conclusions to bear out and confirm the pathogenic power of this organism in the development of peritonitis. Malvoz ⁸ carries out similar researches upon 7 cases, dead from the same cause, with similar results.

Blood.—Krause ¹³ gives the results of certain work upon blood-parasites; upon the same ground as that taken by Ray Lankester, he considers the nuclear-appearing bodies observed in the blood to be true parasites, connects them with the gregarinidia, and gives them the name of hæmo-gregarinidia. He has also found parasites in the blood of persons not affected with malaria very similar to the half-moon shape of Laveran.

Bacillus with Brown Circumference.—Scheibenzuber ⁵³ gives a very full description of a new chromogenic bacillus that he has discovered. Its origin is in decomposed eggs, and to it he has given the name "the bacillus with the brown circumference," owing to the peculiarity of color produced about the colony upon its growth in gelatin.

Chinch-Bug Disease.—Forbes ⁷⁹ furnishes an article on a bacterial-insect disease,—the chinch-bug,—giving a very full description of the methods of growth of this organism.

Cholera.—At the Seventh International Congress of Hygiene, ⁶ Hueppe reported his researches upon the comma bacillus, its morphology, and its reaction. He described the different modes of culture employed by him, and the results of inoculation experiments upon animals. These inoculations caused death, with all the symptoms of cholera. He described, also, the effects produced by the ptomaine of the bacillus upon the intestinal tract.

Klein, of London, in the discussion, said that his own experiments did not accord with those of Hueppe. He did not think that the comma bacillus was found in sufficient numbers in all cases of cholera to produce the malady. He recalled the fact that Cunningham, of Calcutta, had searched for the comma bacillus with great care in 10 cases without finding it, and, besides, the comma bacilli described by different authors are not identical. Noticeable differences are observed in their morphology, culture,

and development. Cunningham has isolated eight different species of the comma bacillus in cholera; morphological distinctions are maintained in secondary cultures made from the original ones. The comma bacillus is, moreover, found in the normal mucous membrane of monkeys and guinea-pigs, as demonstrated by the microscopical preparations presented by him. Bruce, of Nealey, injected a pure culture of the comma bacillus into several guinea-pigs and they all died. The bacillus needs to be cultivated on the interior of the egg and maintains its virulence longer there than elsewhere.

Cancer.—Dentu⁸_{Apr. 11} reviews a large amount of work done in his laboratory upon the nuclear-appearing bodies occurring in cancer. He apparently feels very strongly that these are true parasites, related to the coccidia, and his paper brought out a good deal of discussion, the gist of which seemed to support the view which he had expressed.

Hache⁹⁰_{Feb.} describes 4 cases in which the presence of a sporozoa is affirmed,—a morbid growth of the lip, tongue, and inner margin of the anus, and a scirrhus of the breast. The parasite is stated to occur in and among the epithelial cells, often in cell-nests, and to vary in size from 2 to 5 microns up to 20 to 50 microns. The smaller organisms are intra-cellular, the larger inter-cellular; they are spherical and encapsulated, the enveloping membrane being thick and highly refractive. They consist of granular protoplasm, and often possess a nucleus. Within the cell they sometimes appear as in a vacuole, owing to the shrinking of the surrounding protoplasm during hardening. In picrocarmine-stained sections the organism is tinted yellow; it is deeply stained by haematoxylin. As the organism grows, it comes to fill the whole of the cell, which it destroys. It is classed among the sporozoa as a coccidium.

A very complete review is given³¹_{Dec. 14, '90} of the knowledge in regard to the bacterium of cancer. Callamo¹ takes the ground that, thus far, nothing has occurred to show that the supposed coccidia occurring in cancer are true parasites. The same ground is taken by Schutz,³²⁶_{Jan. 24} who expresses the opinion that we are as far as ever from finding the true organism that produces cancer, even supposing that it exists. Domergue¹⁴_{Apr. 5} follows out a similar course of reasoning, stating the following conclusions: The examination of

the cellular transformation occurring in epitheliomata and the successive forms assumed by these bodies called coccidia do not incline us to believe in their parasitic nature. Moreover, repeated examinations prove that, in these cases, there is merely a cellular transformation going on. Finally, it is impossible, the preceding premises being granted, to accord to these alleged coccidia any rôle in the production of carcinoma.

Albarran, on the other hand, differs from this author. M^{me} lassez has discovered coccidia in different specimens, and the observations were verified by Balziani. Barier has made cultures of the coccidia found in the specimens. Albarran believes that, in addition to the transformation cells observed by Domergue, true coccidia might be found lying side by side in the same specimens.

An editorial⁶ voices the opinion of all proper-minded medical men in regard to the transference of a minute fragment of the cancer of one breast into the healthy opposite breast of the same patient with the result of a reproduction of the same disease at the spot of insertion, as reported by Cornil. "The experiment is only a lame one in a scientific sense. It was attended by every circumstance that can add to its meanness and its infamy. What we are concerned with is the line of demarcation between humanity and heartlessness. The very justification of careful experiments on animals is the superiority and sanctity of human life in the very humblest man or woman in the most unpretentious station in life. A medical man who tampers with human life betrays his profession, and for that act should be removed from it. This is the real moral of the case that has so properly shocked the French Academy of Medicine, and will shock all men who know the trend and tradition of medical sentiment. It will have one good effect,—it will secure a recognition of the fact that we must never lose sight of the ethical side of our profession, and must claim from the legislature fuller power for the medical authority to deal finally with those who disregard it."

A correspondent,⁷ referring to the same subject, takes very much the same ground in regard to it, and speaks of similar experiments, only with more proper surroundings, made by a German surgeon in Berlin.

Diphtheria.—Immunity to the injection of the diphtheria bacillus in guinea-pigs has been obtained by Brieger and Fraenkel,

who give the details of the methods by which their object was attained. ⁴ The general means employed was the material extracted from pure cultures of the bacillus of diphtheria, and the article unquestionably furnishes an important point in the investigation of the great subject of immunity and possible cure of the infectious diseases. To be contrasted with these results are those of Behring, which may be summarized as follow: (1) the blood of rabbits rendered immune against tetanus presented bacterial healing properties toward the bacillus; (2) these properties belong also to extra-bacillary blood and to the serum of animals naturally immune; (3) these properties are of such a durable nature that they remain active, even in the bodies of other animals, so that it is possible to obtain good results by the operation of serum- or blood- transfusion; (4) these properties are entirely absent from the blood of such animals as are not immune against other diseases, and, when the poison of tetanus is introduced into these animals, it can be found after death in the blood-fluid of the body.

Erysipelas.—Fraenkel ⁶⁰ gives the result of further work of his upon the streptococcus of erysipelas, as a result of which he considers that he has offered further proof of the identity of the streptococcus of erysipelas and of the streptococcus pyogenes.

Royet, ¹⁴ at the meeting of the Society of Biology, held on September 10, 1891, states that when the streptococcus of erysipelas develops in a soluble medium protected from the air it produces a poisonous substance that is precipitated by alcohol and destroyed by heat. The filtered but not heated cultures injected into the veins of an animal diminish in a durable manner the power of resistance to infection by the streptococcus; that is, renders a tissue more prone to its effects. But the filtered and heated cultures augment the power of resistance to the same infection.

Glanders.—Singer ⁵⁴, gives the results of much work of his upon immunity, including especially the production of immunity by the product of the glanders bacillus. Of these, one or two are especially interesting, particularly the one statement that intravenous injections of the sterilized glanders culture produces immunity in rabbits, for from three to six weeks, against virulent glanders cultures. Silveira ⁵⁵, presents a case in which the rapid diagnosis of glanders was made, after the method of Straus, by the

inoculation of the suspected material into male guinea-pigs, which presented, after the second or third day, a marked glandular affection of the testicles, which is a special form of localization for this material. Hellman²¹³⁰ lays stress upon a similar method to be employed for the diagnosis of glanders.

Gonorrhœa.—Hugounenq and Éraud²¹¹⁹, tell of their experiments upon soluble products obtained from a bacterium, cultivated from gonorrhœal pus. The results are exceedingly interesting and curious. The authors conclude that the bacterium cultivated by them produces a phlogogenic material which appears to act only upon the testicle, and which can, perhaps, clear up somewhat the pathogeny of gonorrhœal orchitis. They have isolated from the culture media of this bacterium other substances than the one upon which a special stress is laid, and they mean to continue the studies, to ascertain what toxic products are present and their methods of action, in order, if possible, to settle the etiology of certain of the gonorrhœal accidents.

Vibert and Bordas,³¹ after a review of our present knowledge of the gonococcus, come to the conclusion that the question is far from being settled with the certainty that it requires in medico-legal circles, and that in no case is the expert justified in making a diagnosis of gonorrhœa from the bacteriological examinations alone.

Green Pus.—Within recent years the bacillus pyocyaneus has attracted considerable attention both in France and in England: (1) because of the beautiful color to which it gives rise, as its characteristic appearance and manner of growth under certain conditions; (2) because of its action on certain animals; and (3) because, when either the bacillus (Charrin), or merely its products (Woodhead and Wood), are introduced into the body, it seems to interfere in a most remarkable manner with the development of the anthrax bacillus when inoculated at the same time.

Gessard²⁰² has again brought interest to bear on the bacillus itself, and, in a series of experiments, has been able to show that the surroundings of the micro-organism, or the conditions under which it is developed, may so far modify the manifestations of its activity that it seems to become a distinct organism; and that we have in such cases not merely a varietal difference, but even a species or race difference. He gives a definition of race, based on that

of Pasteur in his studies on beer, taking as a basis of the classification not outward-form resemblances, which can often obscure marked differences, but the physiological structures, which are far more important in distinguishing the races than are most morphological characters.

Morat and Doyon,²¹ using the filtered product of the bacillus *pyocyaneus*, found that, after the injection of some ten to twenty centimetres into the veins of a rabbit, the pneumogastric soon lost its inhibitory action on the heart. The vaso-dilators of the sympathetic trunk were paralyzed, while the vaso-constrictors remained unaffected even under considerable irritation. These results they found, however, could not be obtained in the case of the dog; nor were they able to obtain any evidence of any action of this poison on the sympathetic trunk in the cat.

Lactic Acid.—Wurtz and Leudet²² give the results of their experiments as to the pathogenic action of the lactic-acid bacillus on rabbits and guinea-pigs. The symptoms presented by the animals consisted of a diarrhoea, with distension of the abdomen and, above all, an extremely rapid emaciation. They found, also, that in the cultures in *bouillon* or in a solution of peptone, there was an extremely energetic toxine, having the same effect as inoculation of the culture itself.

They suggest that it might be well to examine whether, in certain diseases of the digestive apparatus, especially in dilatation of the stomach, there is not a fermentation, the result of the production of this same toxine.

Leprosy.—Kanthack and Barclay,²³ in a preliminary communication, announce that they have succeeded in isolating and cultivating from leprous tissues, removed under all aseptic precautions from patients during life, a bacillus that may fairly claim to be a true bacillus of leprosy. Their conclusions are as follow:—

“ We consider the bacillus to be a pure cultivation of the bacillus *lepræ* for the following reasons: (1) the manner in which the material was obtained excluded contamination from outside; (2) 2 cases under exactly the same conditions gave absolutely identical results; (3) in the original tubes three bacilli, which were undoubtedly leprosy bacilli, were found, and these gave rise to a growth on agar-agar which, chemically and morphologically, agreed

with the bacillus of leprosy, with the slight differences stated above; (4) cultivation on gelatin and glycerin *bouillon* were still more convincing."

The description of the organism, as given by the authors, answered very well to the probable condition of the bacillus of leprosy, and it is to be hoped that true success has attended their efforts in this direction.

Using material from persons affected with leprosy, they obtained bacilli, in the form of slender rods, which took Ehrlich's method of staining well. They grew upon solid-culture media of peptone and 3 per cent. sugar, not in fluid-culture media. The growth began between seven and nine days after inoculation of the nutrient material. In mice the bacilli appeared to be non-pathogenic.

The same authors² give the results of the examination of their cultures by Fraenkel and Baumgarten, neither of whom could acknowledge the identity of the two bacilli, claimed by Kanthack and Barclay, for the following chief reasons: (1) the bacilli are not morphologically identical, as originally asserted by the authors; (2) the resistance of their bacillus against acids is too weak; (3) the fact that the bacillus grows with ease on artificial nutrient media.

"Baumgarten, moreover," say the authors, "identifies our bacillus with a saprophyte occurring frequently upon the epidermis, and hence called the 'bacillus epidermitis.' He has himself cultivated the latter from cancerous material, and considers it identical with Scheurlen's carcinoma bacillus. We feel that we were misled by the resistance against acids which our bacillus possessed, and spoke of a morphological identity where an absolutely impartial examination could only claim a certain amount of resemblance, which Fraenkel, however, considers to be only slight. This, in itself, is an insuperable objection, and we therefore consider it our duty to correct a mistake, and record our experiments as yet another unsuccessful attempt at growing the leprosy bacillus in artificial media."

Malaria.—Golgi⁵⁸ demonstrates the development of various parasites by photography, using for his subject the growth of the amœba *malariae*. The photographs are reproduced as Plates 1 and 2.

Explanation of Plates 1 and 2.—The photographs show, among the red corpuscles, the development of the malaria parasite in "quartan" fever. The photographs were taken with the new large photographic apparatus of Zeiss. Nos. 1, 2, 4, 6, 7, 8, 9, 10, 12, with Zeiss apochromatic 1.5 mm., 1.30 ap., projections ocular 4, open condenser. Phot. 3, 11, with Zeiss apochromatic 2.00 mm., 1.30 ap., projections ocular 4, open condenser. Phot. 1, 2, 3, 4, 5 show the progressive growth of the parasite during the two days of apyrexia. The parasites destroy the substance of the corpuscle and change the haemoglobin into melanin. When the growth of the parasite has progressed pretty far, and there remains only a ring of the corpuscle substance, this change of the haemoglobin ceases. The metamorphosis of the haemoglobin follows progressively the entrance and growth of the parasite, and furnishes a means for the differentiation between the parasite of the "tertian" and the "quartan" type. Phot. 6 to 12 show the further stages of growth,—completion of the cycle and division of the parasite on the day of the attack. Phot. 6 shows the parasite (taken on the morning of an attack that came in the afternoon) having destroyed the greater part of the red blood-corpuscle, but with still a small part of the corpuscle surrounding it, with the characteristic haemoglobin color. In Phot. 7 the parasite has destroyed the entire corpuscle, and appears in it as a free, pigmented, protoplasmic body. In Phot. 8, 9, 10 is shown the completion of the reduction of the pigment in the middle of the corpuscle and the beginning of division. When the melanitic bodies are collected together in the centre in a black clump, the division of the almost-transparent protoplasmic body begins (10). In Phot. 11 the division is shown clearly (the so-called "daisy" form). In Phot. 12 the division is completed, and the new generation of the parasite appears in the form of small, round, unstained bodies, separated from each other.

Rosenbach,⁴ failing to cultivate the parasites of malaria in artificial media, bethought himself of preserving them alive in the leech, because this annelide, in virtue of some peculiar substance contained in its body, prevents coagulation of the blood, and can keep it for months in its digestive tract in a liquid condition. He tried a number of leeches, with the following results: (1) that the parasite of malaria can be kept alive for at least forty-eight hours in the digestive canal of the leech; (2) that quinine is able (although it may not prevent a rising temperature, owing to its too late administration) to prevent, for at least a day, development of the parasite. Further investigation in this direction will be carried on.

Pleurisy.—Courtois-Suffit⁵⁵ discusses purulent pleurisy, which he divides into three great classes: that due to Fraenkel's pneumococcus, that due to the staphylococci, and that due to the bacilli of tuberculosis. The characteristics of the various forms are very well worked out and described.

Streptococci.—Lingelsheim³ has attempted to carry out a long series of experiments upon the history of the streptococci, on their pathogenic properties, their identity and differences, which to the present time are veiled in great obscurity. The results are given at length.⁵⁸

Fig. 1.



Fig. 2.

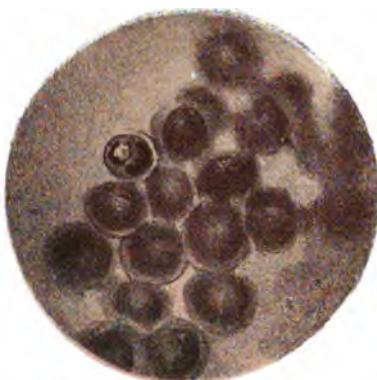


Fig. 3.



Fig. 4.

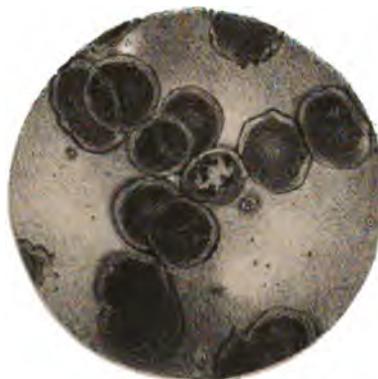


Fig. 5.



Fig. 6.



Malaria Parasites. (Golgi).
Zeitschrift für Hygiene.

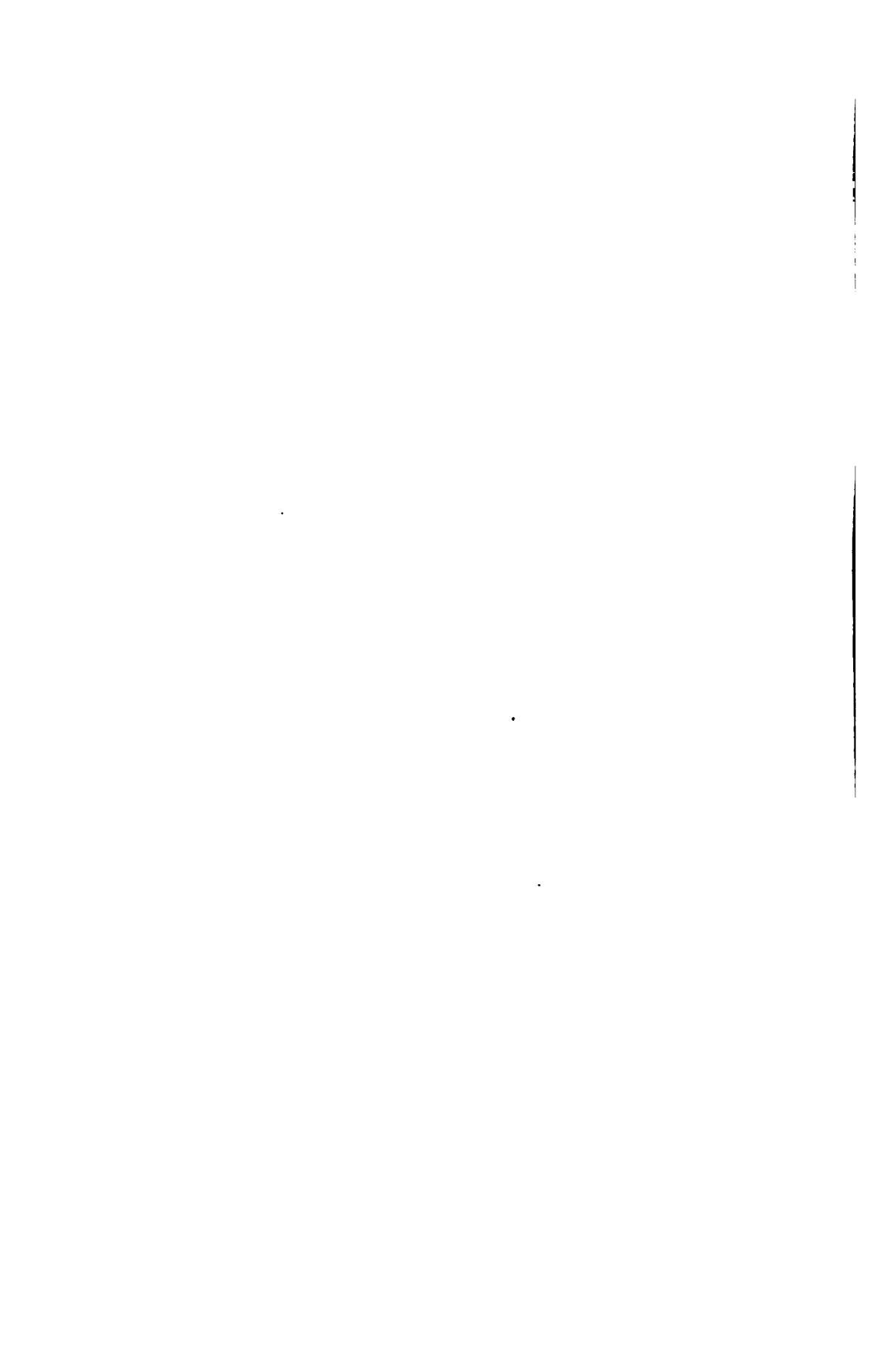


Fig. 7.



Fig. 8.

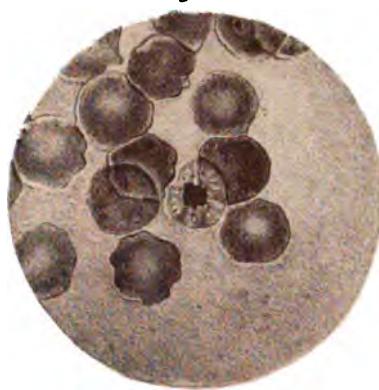


Fig. 9.



Fig. 10.



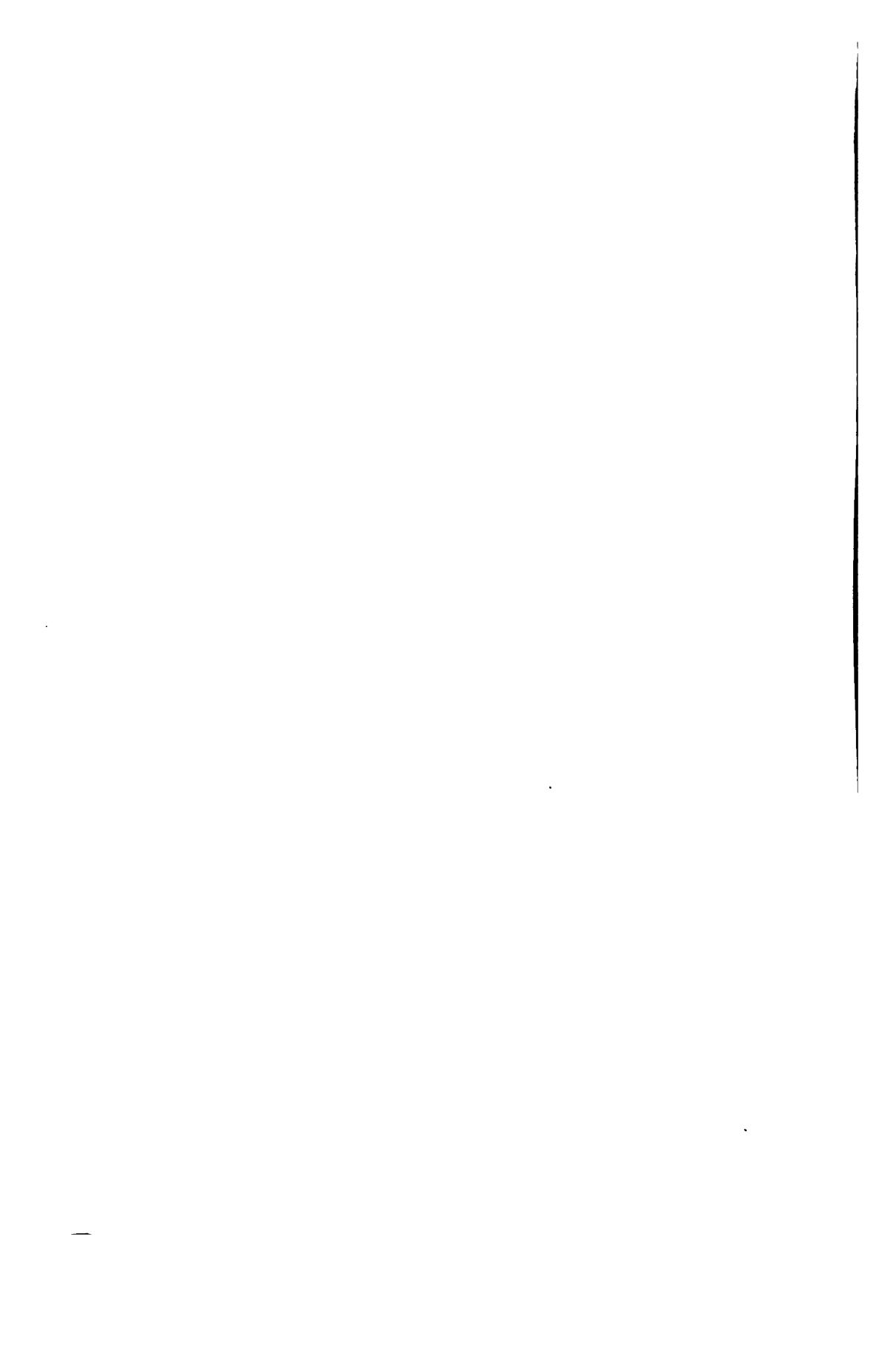
Fig. 11.



Fig. 12.



Malaria Parasites. (Golgi).
Zeitschrift für Hygiene.



Swine-Plague.—Frosch, ⁵⁸ in an elaborate article upon the researches on the American swine-plague, makes an attempt to settle the question of differences or identity between a large number of bacteria connected with this and similar diseases.

Caneva ⁵⁰ states that the disease (swine-plague) of pigs is not a simple one. He ranges it in three groups, and studies the differences that characterize the bacteria. The first group,—that of Hueppe, Schuetz, Kipp, Orest-Armanni,—characterized by non-motile bacteria, not growing upon potato, growing with difficulty upon gelatin,—a medium upon which the colony does not resemble those of typhoid; the second group,—that of Rietsch, of Marseilles, and of Billings,—produced by a motile bacterium, whose colonies upon gelatin resemble those of typhoid, and grow freely upon potato; the third group comprising two bacteria,—the hog-cholera of Salmon and the swine-plague of Selander. These two bacteria are motile, grow quickly and abundantly upon gelatin, but their colonies do not resemble those of typhoid. On potato the bacterium of Salmon develops abundantly; that of Selander grows like the bacillus of typhoid.

Syphilis.—Murschalko ⁸⁴ announces a new and comparatively easy method for the demonstration of the bacillus of syphilis. Sections should be left in strong Loeffler's methylene-blue solution for some time,—at the temperature of the room for thirty-six hours; in a thermostat at 38° C. (100.4° F.) for three to four hours; then washed with distilled water, and a contrast obtained with a concentrated solution of vesuvin. In this way preparations are obtained in which deeply-blue-stained bacilli stand out well upon a brown ground. The bacilli were found in all sorts of syphilitic tissues.

Sporidia.—Talamon, ³¹ in an article upon the psorosperms, states: "This new variety of micro-organism actually tends to acquire, in the etiology of disease, an importance that a year or two ago no one suspected it would have." He gives a very good review on our present knowledge of the subject.

Tetanus.—Tizzoni and Cattani ⁵⁰ give the results of their work upon a method of securing immunity against tetanus, which are not only confirmative of those of Behring and Kitasato, but show also that the blood-serum of an animal which has been rendered refractory to tetanus can neutralize, in a small dose and a short time, the

virulent toxic substance of a tetanic culture, and that, on the other hand, the injections of the blood-serum of an animal having acquired immunity is not uniformly active for all species of animals.

Tuberculosis.—Of course, the most important and interesting occurrence in regard to this disease during the past year has been the results obtained from the use of Koch's material derived from the cultures of the bacillus producing it. The opinions in regard to these results are about the same. In regard to the whole matter, one of us has given a summary,²⁰²⁰ of which the following are extracts: "The grievous part of the whole matter is the too early announcement and application of laboratory results to clinical practice, and the inevitable destruction of confidence in future work of a similar character that will result from the failure of the hopes which were entertained in regard to this material. I believe it should be said, however,—and I am supported in the assertion by at least some of those best fitted to judge,—that the failure of 'tuberculin' to accomplish what was hoped for from it does not in the least alter the probabilities which furnish guide-posts to the investigator for the direction of his work; and that it seems as probable now as last year that, by methods which are still to be worked out, there is to be isolated from the cultures of the various bacteria, or from the results of the activity of these cultures, something which will prove destructive to their activity and hurtful action in the human body. Before this can be accomplished there are still many stumbling-blocks to be avoided and many complicated questions to answer; so that the question which is under discussion at present must be regarded as merely the first uncertain step toward something which may be of great benefit to us all.

. . . The results obtained from the clinical use of tuberculin having fallen so lamentably far short of what was hoped for, it has been the desire of those not too much discouraged with the whole subject to care any more about it to attempt to find some reason for this failure, and to see what alterations could be made in the methods of preparation or administration to bring about more favorable results. . . . However, from the very fact that the material was well known to be a mixture, and that so little was understood of its composition, the necessity for a complete examination of what it actually is was easily manifest. How little even Koch himself knew of this composition at the period of his first

announcements is shown by the work of Hunter and Cheyne.² Koch's statement that the active curative principle of tuberculin is thrown down by absolute alcohol is shown to be incorrect, if these latter experimenters are not in the wrong, and the heavy white precipitate seen so abundantly upon the addition of alcohol to tuberculin is by them shown to contain the portion of the elements which produces the febrile and other disturbances, and not to be concerned with the beneficial effects which are sought for.

... It is a pleasure to speak of this work, for it is free from the objectionable feature that hangs about the original announcements,—the absence of details in regard to the experiments by which such momentous results were claimed to be reached. If anything is ever to come from the investigations upon the newer lines of research it must be by the full description of how each step has been made, and, with the shock which our credulity has received in the last year, it is too much to ask for, that credence shall be given in the future to any such extent as has obtained in this instance.

... Cheyne, Arloing, and Pfuhl, as well as the editors, have failed to secure either immunity or cure of guinea-pigs in tuberculosis by the use of tuberculin, and, in view of these results, the terms used by Koch⁶⁹ to designate the results so far obtained by bacteriologists in their work with tuberculin are, to say the least, inaccurate, and inappropriate as coming from him."

Typhoid.—Much has been written during the last year upon the typhoid bacillus and the best method for differentiating it, as well as upon its various characteristics. Rodet and Roux are quoted by Chauveau,³ in answer to the articles of Chantemesse and Widal,¹⁴ as insisting upon the marked difference between the bacillus of typhoid and the bacillus coli communis. Blachstein⁷⁶⁴ and Welch⁷⁶⁴ give an interesting account of intra-venous inoculation of rabbits with the bacillus coli communis and the bacillus typhi abdominalis. De Bavay²⁸⁵ has written an exhaustive paper upon certain experiments and observations on the saccharomyces and their relations to the typhoid bacilli. Dupr¹⁰⁰ takes up the comparative biology of the bacillus of typhoid and the bacillus coli communis.

The whole subject is well summarized in an article by Babes⁵⁸ upon the variability and varieties of the typhoid bacillus. He gives a very accurate and useful comparative table of the

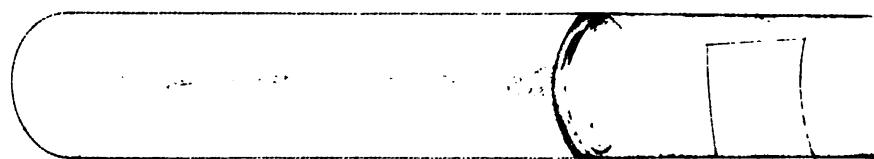
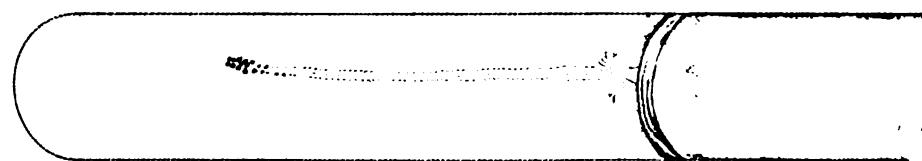
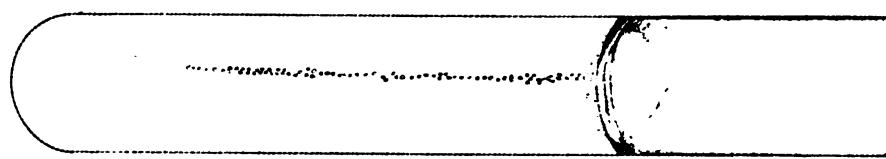
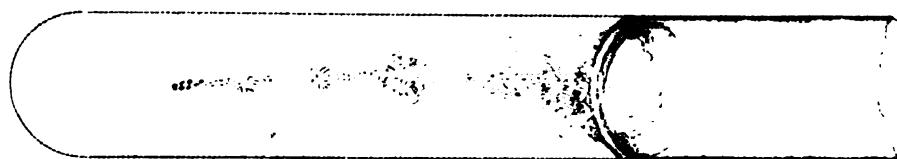
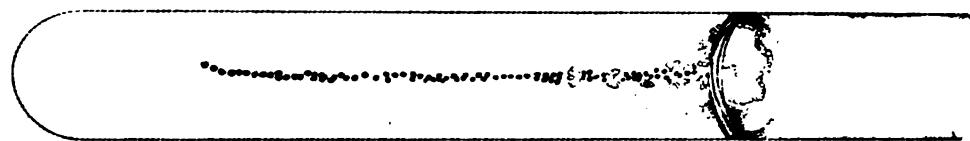
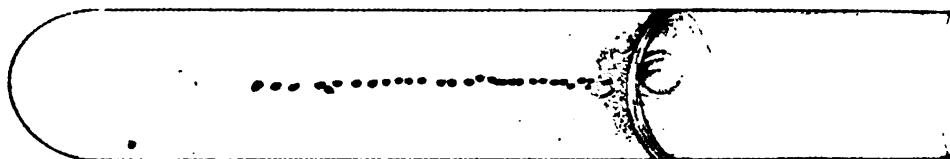
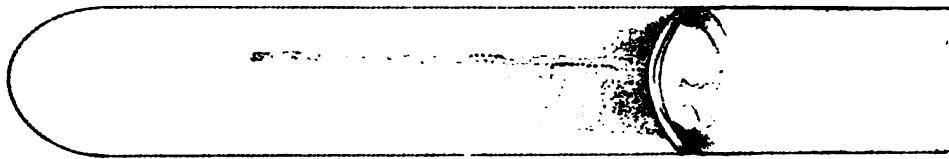
methods of development of those bacteria which are likely to be confused with the typhoid bacillus, with a plate showing the appearance of the various cultures in gelatin, which is reproduced in this article. (Plate 3.)

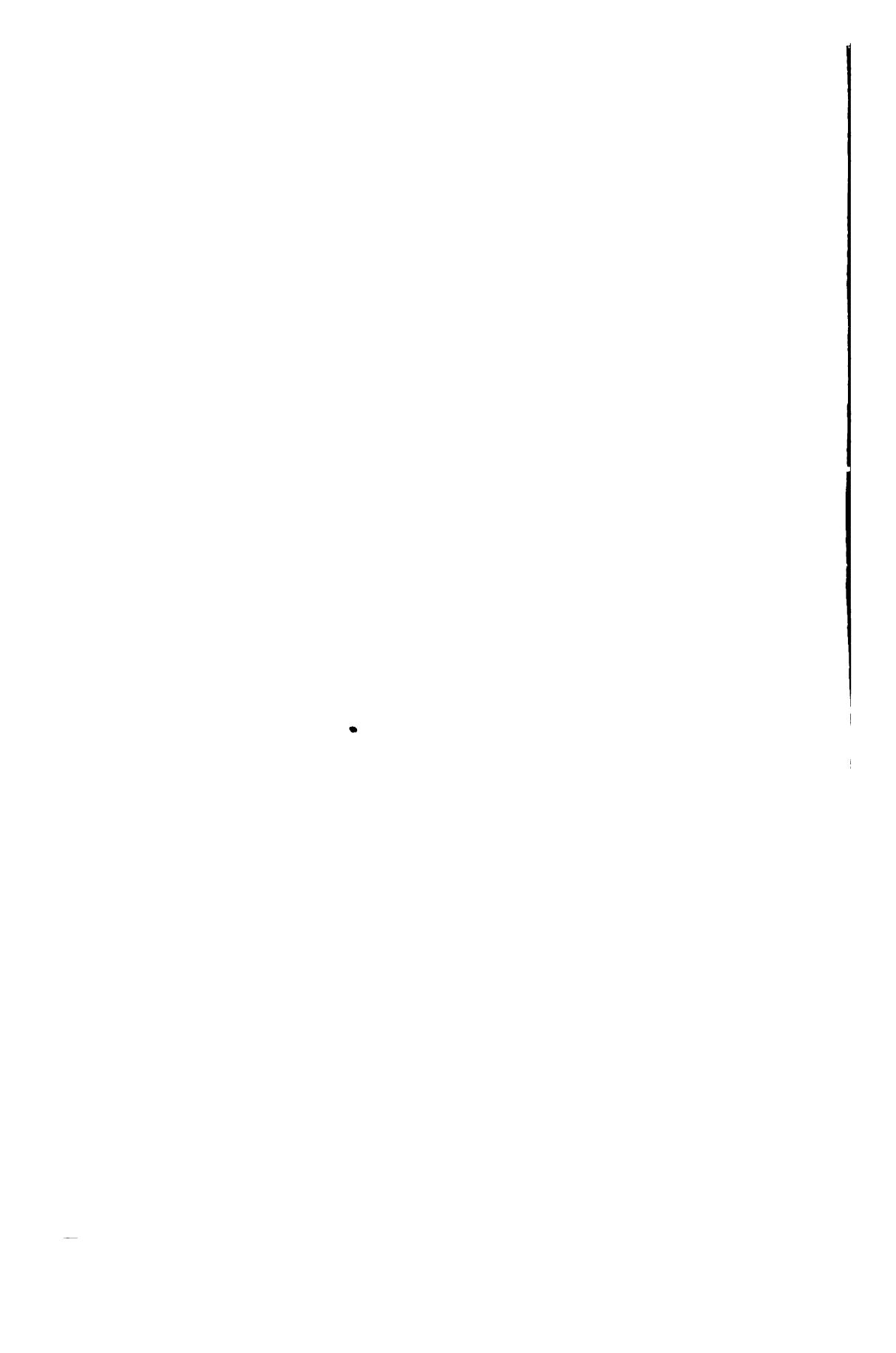
Explanation of Plate 3.—Relative cultures, 4 months old, of typhoid bacilli and of bacilli similar to them: Fig. 1. Culture of typhoid bacillus from the standard at the Berlin Hygienic Institute. Fig. 2. Culture of typhoid bacillus from one of the author's cases of typhoid fever. Fig. 3. Culture from lung of a typhoidal case,—very similar to the typhoid bacillus, but producing small crystals, glittering on the surface, and very pathogenic to mice and rabbits. Fig. 4. From the same lung. Culture growing freely on the surface, producing masses of crystals along the needle-track. Fig. 5. Another similar bacillus growing freely on surface, with separated colonies along needle-track, a brown color, and thick, wedge-shaped masses of crystals. Fig. 6. From mesenteric glands of mild typhoid. Round, elevated colonies on the surface, from which extends thin film; large, brownish colonies along needle-track, with production of crystals just below surface. Fig. 7. A bacillus from the spleen. Uniform growth over surface; finely serrated; crystals only on surface; very free growth in needle-track.

Uffelmann,¹ proceeding from the known fact that the bacillus grows on potato with an acid reaction, attempted to ascertain if it would grow on other acid nutrient soil, and found that it would grow on nutrient gelatin rendered acid with citric acid or alum, and that it bears a high degree of acidification. It would also grow on gelatin strongly colored with gentian violet. The colonies developing on such a medium were, after twenty-four hours, rounded or ovoid, sharply edged and clear, and still uncolored. They become tinged with blue, however, later, and finally take on a blue color as intense as that of the gelatin on which they are growing.

Vaccination.—Bard² vaccinated a rabbit, the results being positive. Vaccination on the calf from this was also positive. The rabbit is therefore susceptible to vaccination. Vaccine from a rabbit is richer in serum than the vaccine of the calf, and approximates that of man. These results are interesting, as they may be useful from the point of view of the reproduction and preservation of vaccine virus.

Water.—Sanarelli³ has found in a spring water a bacterium—the bacillus *hydrophilus fuscus*—which was pathogenic for both cold- and warm-blooded animals. Grown on agar plates, numerous round, smooth, grayish-white colonies make their appearance in from twelve to twenty-four hours. These colonies have a somewhat bluish, translucent margin. Grown in agar tubes, there is a bluish fluorescence along the needle-track and gas-bubbles are





sometimes developed. At the end of three or four days the fluorescence disappears, and the growth becomes brown in place of white. The rods examined from such a culture are small, but motile; some short and oval, the longer ones having usually a delicate transverse mark, as though of commencing division. The organism liquefies gelatin very rapidly, and in three or four days this liquefaction is complete, with a profuse white deposit or precipitate. It liquefies serum and causes cloudiness in *bouillon*. On potatoes it grows after twelve hours; has a straw-colored film, which then becomes yellow and, later, brown, very like the glanders growth on potatoes. It can be distinguished from glanders and *pyocyaneus* on potatoes by the addition of a 20-per-cent. solution of bichloride of mercury by the following reaction: Glanders, yellowish; *pyocyaneus*, greenish blue; *fuscus*, milky, somewhat reddish in the middle. It is easily stained with a preparation of methyl-blue in a 1-per-cent. solution of osmic acid; will not stain by Gramme's method.

It produced marked glandular swellings in guinea-pigs, which were very susceptible to the action of minute quantities. In one case a rabbit died in three hours after subcutaneous injections. Effects were observed upon puppies, old dogs, kittens, white mice, rats, hedgehogs, fowls, and pigeons.

The description of the organism is very fully carried out, and it is one of very great interest among the newer organisms which have been brought forward during the past year.

Yellow Fever.—Freire¹⁵² describes his amaryl microbe, or the *cryptococcus xanthogenicus*, which is round and has a diameter of one-thousandth of a millimetre. This organism is only found in the tropics. Quite often the *cryptococcus* is arranged in little chains. In culture it gives rise to yellow and black pigments. The former is soluble, and stains the skin of persons having yellow fever; the latter gives color to the vomited matter. When the blood of yellow-fever patients or a culture of the microbes is injected into guinea-pigs, yellow fever is produced. The ptomaines only produced certain symptoms. Transplantation attenuates the culture, and it is possible to protect the human system from the malady. Inoculation produces a group of phenomena similar to those of the invasion of yellow fever. In forty-eight hours the symptoms have disappeared. Sometimes icterus is produced. Freire has made a

large number of inoculations, the average mortality of inoculated subjects being four-tenths of 1 per cent.

These results seem to be very clearly given and very clearly worked out, but they are certainly not in accord with those published by the United States investigator commissioned for the purpose of determining the value of Freire's work.

MISCELLANEOUS ARTICLES.

Aniline Dyes.—Eraud and Hugounenq²¹ give the results of their experiments with seven aniline colors on the development and virulence of certain bacteria. The only two which produced notable effects were methylene blue and safranin. These seemed to retard development of the microbes. They appeared to lessen their virulence, without lessening their vitality, if a dilute solution were used for a short time. If the solution were concentrated and used for a longer time, the vitality was also affected.

Bacteria.—Metschnikoff²² gives an exceedingly interesting lecture upon new ideas of the structure, development, and production of bacteria, stating that, in order to study them well, this small group of micro-organisms should be considered not only by itself, as if it were isolated and constituted some special affair in nature, but also in relation to other neighboring groups of animals and plants.

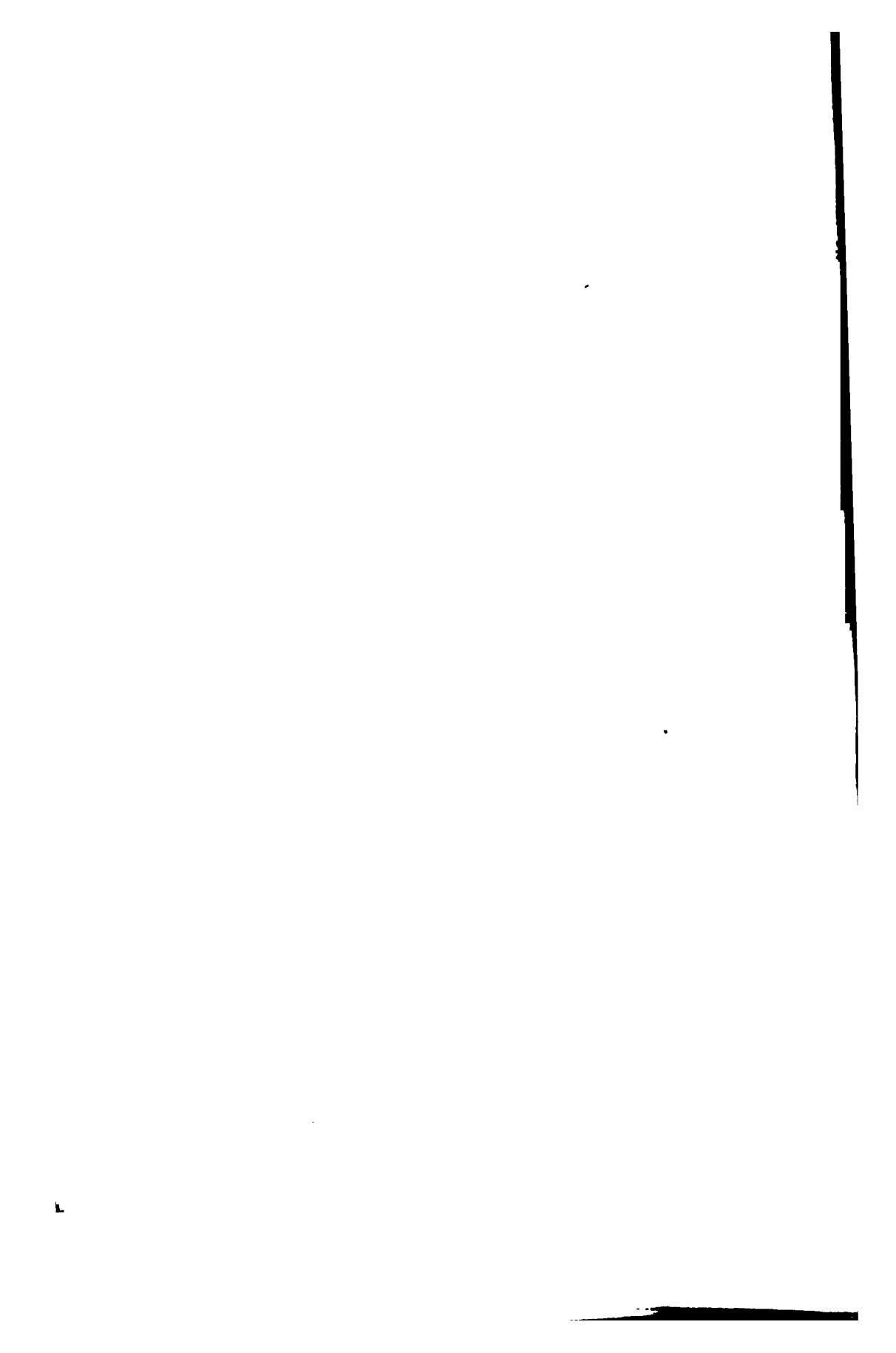
Cellular Pathology.—Virchow²³ gives a very interesting and complete statement of his present views upon cellular pathology and its position. He concludes that it would seem that the ultimate aim of cellular pathology is the localization of diseases; the determination of the particular parts which are selected for separate morbid action; and this leads, by but a small step, to local therapeutics, which means nothing less than a revolution of the old line of treatment. This revolution is hastening on, and it is not only the direct outcome of a cellular pathology, but it will advance under its protection, in spite of all the attacks to which it may be exposed.

Dead Bacteria.—Prudden²⁴ gives the results of some exceedingly interesting experiments upon the action of dead bacteria in the living body,—results which have been carried on further by the investigation of the action of dead bacilli of tuberculosis, localized in the lungs by introduction through the trachea, in an

article which appeared after the preparation of this summary was begun.

Disinfection.—Behring ² read, in the Section of Bacteriology at the International Congress of Hygiene, in London, a very complete article upon disinfection in the living body. There are four possible ways in which it is conceivable that this internal disinfection may be effected: by killing the disease-producing germ; by hindering its growth; by counteracting its disease-producing properties, pathogenic organisms losing their power to produce poisonous products; and by antagonizing the action of, or destroying altogether, the various toxic products produced by the bacteria.

As a conclusion, he says: "I may add, perhaps, that in the general treatment of infectious diseases the same principle may be found to apply as Lister has employed with such great results in the case of the local treatment of infectious wounds, namely, to remove or render harmless the various causes of disease, while leaving the living cells of the tissue in peace."



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BY N. I. McCARTHY,

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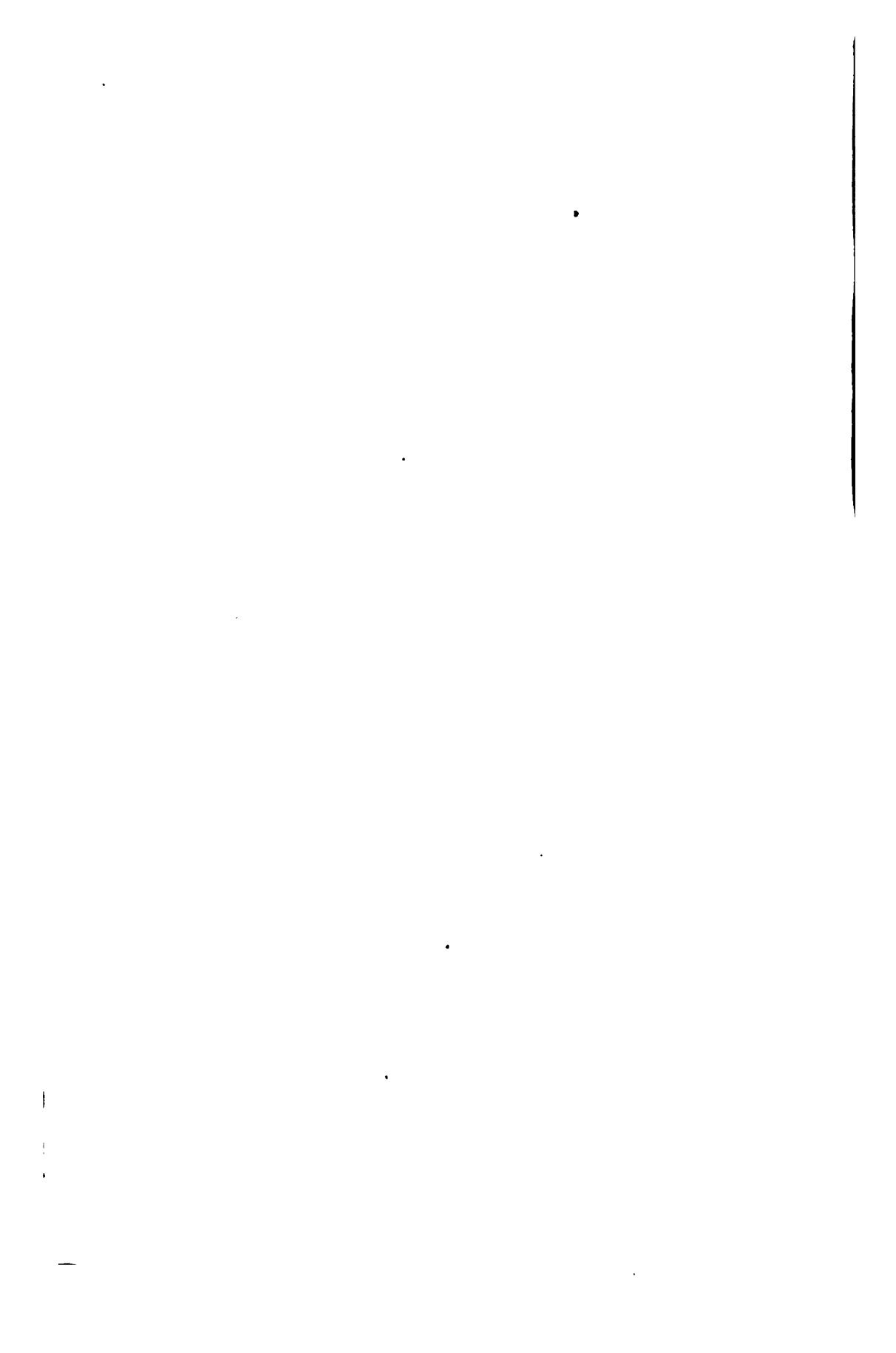
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